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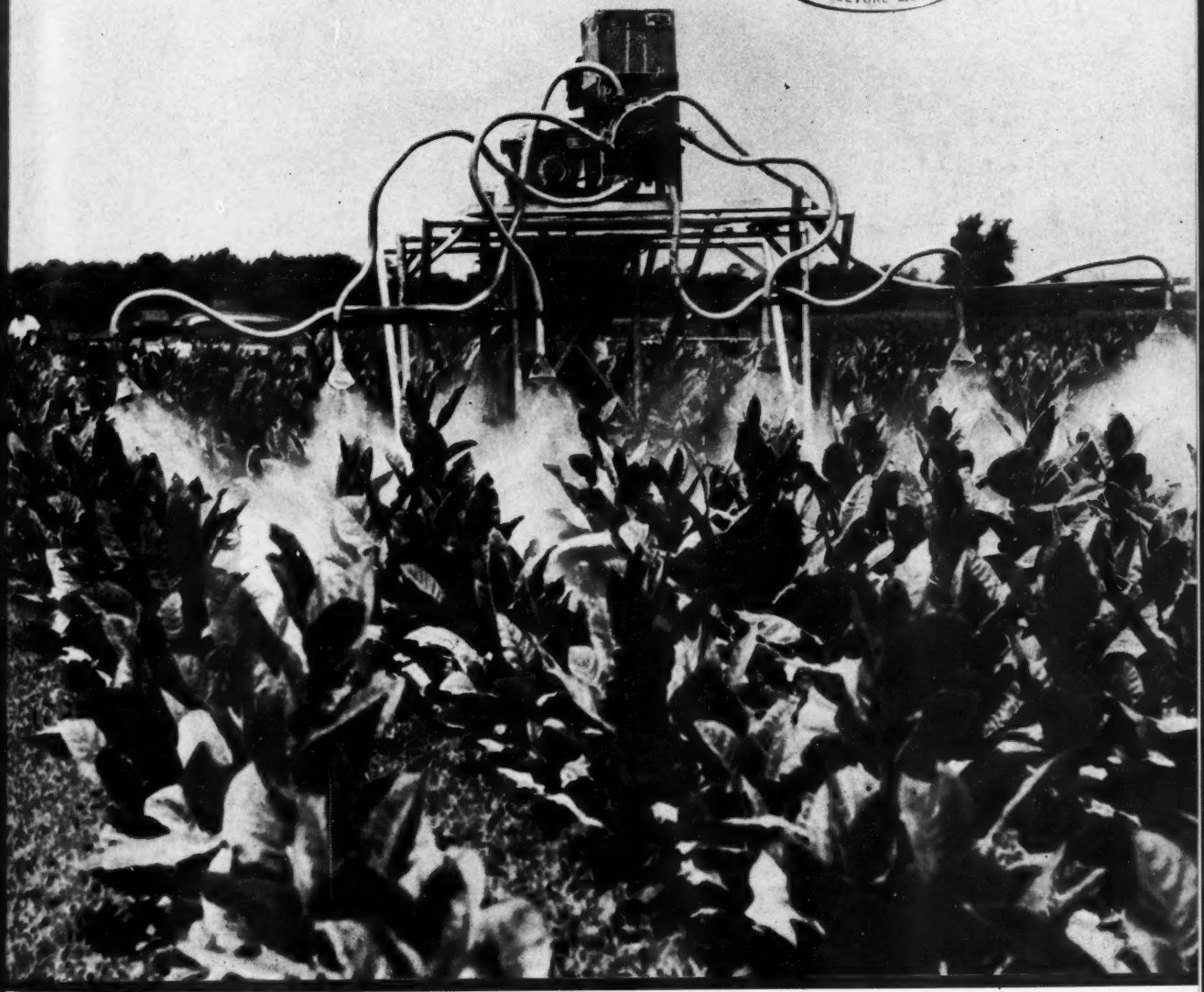

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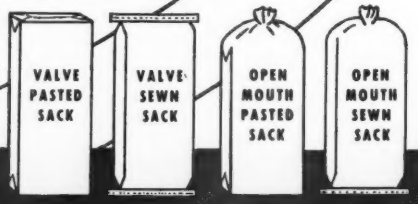

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In this issue . . .

A series of cooperative field tests of a number of seed treatments on spring wheat and oats was carried out during 1953 by R. W. Leukel with the help of cooperators in nine states. Some interesting results were recorded as shown on page 11.

Potash mining is mighty complex, as Link Belt Co. writers found out on their recent tour of the Duval Sulphur and Potash mines and plant. Their description of the facilities with emphasis on materials handling begins on page 15.

Placement of fertilizer must be correct if plant food is to be utilized efficiently. Leonard Lett and H. A. Woodle consider this subject, for cotton and sod crops respectively, in the article on page 20.

Barring fire, storm, etc. the new Fort Pierce, Fla. plant of Naco Fertilizer is here to stay as shown in the short article on page 24. Two years ago a full feature on the previous plant had to be taken off the press because of a disastrous fire which completely destroyed the installation.

State safety departments. Are they a nuisance? Contrary to some viewpoints, F. H. Shuford feels that they can be of great help to the manufacturer—but only if they receive cooperation can safety programs succeed. He reviews this problem at length in the article beginning on page 25.

National Cotton Council folks had a busy month in January when among other events, both the Southern Weed Control Conference and the Beltwide Defoliation Conference were held. Highlights begin on page 29 and include some interesting remarks by C. L. Welch on future activities in the field of defoliation.

Paste fertilizer is now being offered by the Heller Greenhouse Labs. The development and formulation of this interesting and novel product is related in the short article on page 32.

Changes in control recommendations for North Carolina were a subject for consideration at the state Pesticide School held last month. Major changes are covered in the article on page 33. Note especially the increased dosages now suggested for cotton pests and the addition of soil insecticides for control of some specified pests.

State legislatures were quite active during 1953. A brief report on page 34, taken from a more complete CSMA study, relates the principal actions taken which have some effect on the pesticide industry.

The Texarkana, Ark. plant of International Minerals and Chemical Corp. has a very complete belt conveyor system, designed and installed by Barber-Greene engineers. Pictures and a description of the system is on page 36.

A new Miller Bill is in the spotlight. We've tried to review the major points and compare them with those of the previous bill in the editorial on page 64.

Have you seen the new Reader Service department? It's easy to obtain information on a wide selection of products; just fill out the card, circle the right numbers and mail it in, no postage required.

Farm Chemicals

Pioneer Journal
of the Farm Chemicals Industry
Established 1894

Vol. 117 **FEBRUARY, 1954** **No. 2**

Contents

Mostly Personal	5
Washington Report	7
Seed Treatment Fungicides	11
Duval Potash Plant	15
Fertilizer Placement	20
Naco Plant Opens	24
Your State Safety Dept.	25
Cotton Conferences	29
Paste Fertilizer	32
N. C. Pesticide Recommendations	33
Legislative Report	34
Texarkana IMC Plant	36
Industrial News	39
Market Letters	62
A New Miller Bill	64
Reader Service	65
Buyers' Guide	67

Cover Story

High-clearance engine powder dusters such as the one shown on this month's cover are now in use on a wide variety of crops in addition to tobacco. An article on page 33 tells of the major changes made in 1954 North Carolina recommendations for tobacco insecticides.

Photo courtesy National Sprayer & Duster Assn.

A magazine national in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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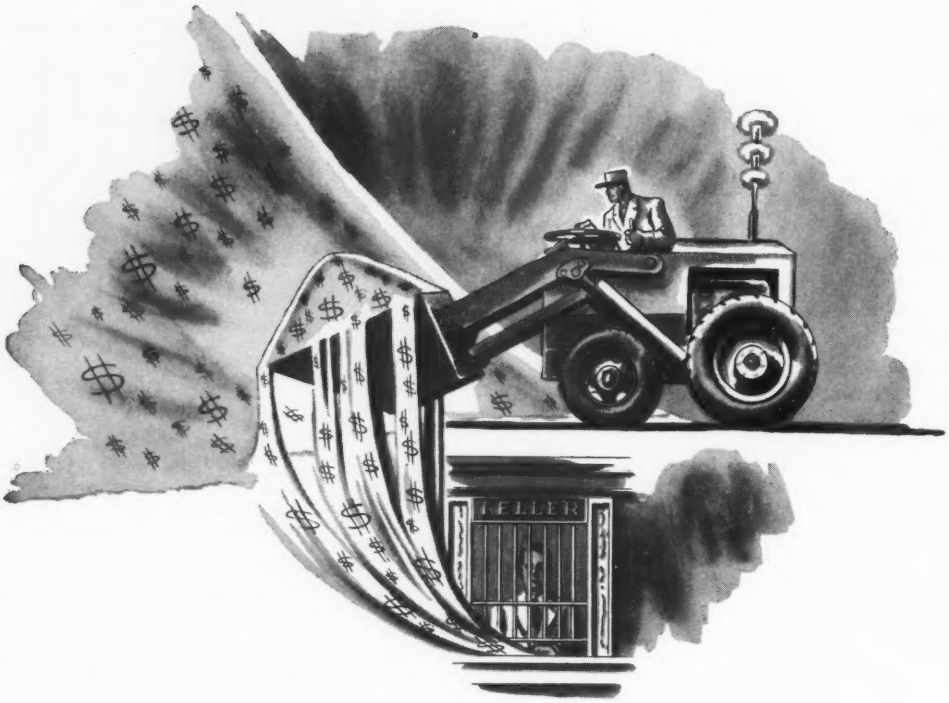

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Farm Chemicals industry notes

. . . Mostly Personal

St. Regis Paper Co. recently appointed Arch Carswell to the newly-created position of vice president in charge of sales for all products of the company. He had been vice president in charge of the Multiwall Packaging division's sales.

Carswell

Working with Carswell will be Vice Presidents Edward G. Murray, Reginald L. Vayo and C. Russell Mahaney.

Carswell, who joined St. Regis in 1928, was named a vice president in 1949 and was elected to the board of directors in October, 1952.

Personnel and public relations activities of Pennsylvania Salt Manufacturing Co. have been consolidated under the direction of Fred C. Abbott, manager of personnel and labor relations since 1947. Concurrently, Dr. W. Austin Bishop, director of training and employee publications, was named manager of public relations.

Colorado Agricultural Chemicals Association and the State Agricultural Clearing Committee held its annual joint meeting on Jan. 29, in Denver. Proposed changes in the state farm chemicals recommendations were reviewed and discussed at these sessions.

Technical sales representative for Emulsol Corp. in the Rocky Mountain area is the E. C. Stone Co., of Denver, Colo.

Edgar A. Murray Co., manufacturer of "Doom" pesticides, Detroit, Mich., has been purchased by Fairfax Biological Laboratory, and is being operated as a division of the latter company.

Davison Chemical Corp. has assigned to William B. McCloskey, vice-president, full responsibility for direction of the company's operational groups—engineering, production, traffic, purchasing and industrial relations.

Lee Fryer has been appointed to the Agronomy Advisory Board of Washington State College. In this position, he will represent the Pacific Northwest Plant Food Association.

A. R. Halvorson, Klamath Falls Experiment Station, has been named program chairman for the Fifth Annual Fertilizer Conference at Klamath Falls, Ore., July 20–22.

C. H. Haas Co. has moved to its new building at Modesto, Cal. Mailing Address: P. O. Box 826, Phone: Modesto 7-0701.

New York offices of Hercules Powder Co. have been moved to 380 Madison Avenue. The company formerly occupied offices at 500 Fifth Ave.

Stauffer Chemical Co. recently named I. Douglas Weiford assistant to the executive vice president in charge of government relations. Weiford has been with the company since 1929.

CALENDAR

Feb. 9–10—N. C. Pest Control Operators' School, Raleigh.
March 7–9—Fert. Section, Southern Safety Cong., Louisville, Ky.
March 8–12—Amer. Mosquito Control Assn. meeting, Atlantic City, N. J.
March 17–18—Comm. Chem. Devel. Assn. meeting, New York City.
March 22-24—Western Weed Control Conf., Tucson, Ariz.
March 24–26—NAC meeting, Houston, Tex.
April 27—Assn. of Cons. Chemists & Chem. Engrs. symposium and banquet, New York City.
May 17–20—Basic Materials Exposition, Chicago.
May 23–25—CSMA mid-year meeting, Cincinnati, O.
June 3–5—Mfg. Chemists Assn. meeting and outing with SOCMA, White Sulphur Springs, W. Va.
June 10–13—APFC annual meeting, Hot Springs, Va.

James M. Maxwell has been transferred from Hercules Powder Co.'s Chicago toxaphene sales group to the same group in Atlanta.

Died: Bernard Joseph Kane at his home in Atlanta. He had been director of purchases at Fulton Bag and Cotton Mills and president of the Atlanta Cotton Exchange.

Calvin L. Dickinson has joined American Potash & Chemical Corp. as advisory engineer assigned to the corporation's plant at Trona, Cal. Recently appointed safety engineer for the Trona plant is Frank A. Jessup.

A tract of land near Bessemer, Ala. has been purchased by Chipman Chemical Co. for erection of a plant to produce farm chemicals.

Robert M. Moore was elected vice president-sales at a recent meeting of the board of directors of Pittsburgh Coke and Chemical Co., Pittsburgh, Pa.

Moore

Moore has been with the company since 1942. For the past seven years he has served as general manager of sales.

In his new position, Moore will be responsible for all general sales activities of Pittsburgh Coke and Chemical.

He is a graduate of Washington and Jefferson College and a resident of Rosslyn Farms.

Production was expected to start last month at Carstens Packing Co.'s new fertilizer plant. Approximately 20,000 tons of plant food will be produced in the $175,000 plant which requires a crew of only six men.

Hudson Pulp & Paper Corp. has signed a contract which will move its New York offices to larger quarters at 477 Madison Ave., New York City. A new building is expected to be completed in time for Hudson's occupancy by Spring.

in a way...

more precious than gold!

Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. ¶ This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.

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31 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Washington Report

By Fred Bailey & John Harms

The compromise Miller bill on pesticide tolerances appears to satisfy most parties interested in the legislation. It was drawn up to cover various objections raised by Food & Drug Administration, chemical industry and farm groups. The new bill is similar to the one pigeon-holed in the House Interstate Committee last summer, minus objectionable details.

New Miller Bill Procedure

Procedure under the new bill is this:

Pesticide manufacturers would petition FDA for a tolerance, submitting supporting scientific information. FDA would be asked to certify that the chemical is useful for the stated purpose . . . and that the requested tolerance was in line with the amount of residue likely to be left on the product if it were used as proposed.

FDA would be required to establish a tolerance within 90 days after receipt of the tolerance request. During that 90-day period, either FDA or the manufacturer could request that the matter be turned over to an advisory committee of scientific experts. The advisory committee would be appointed from a list submitted by the National Academy of Sciences by the Secretary of Health, Education and Welfare. The committee would make recommendations to the Secretary.

Public hearings also are provided for . . . in event anyone deems himself adversely affected by a tolerance. An order, resulting from a public hearing, then would be subject to a court review . . . "in the manner generally prescribed in other regulatory statutes."

That is one of the differences requested by FDA, between the new bill and the original bills. Under the earlier bill, a "de novo" appeals procedure was suggested. Such a procedure would have prohibited evidence developed during government hearings to be used in court proceedings.

The new bill bars agricultural raw commodities containing excessive residues. FDA opposed a section of the old bill which would have barred only foods containing excessive pesticide residues from interstate commerce.

NAC Gives Its Support

The National Agricultural Chemicals Association will support the bill. Lea S. Hitchner, executive secretary, says: "We believe that this new bill submitted by Rep. Miller is in the public interest and is a practical, realistic approach to regulating the use of farm chemicals to protect crops against pests . . ."

Miller has decided to hold up hearings and further consideration of HR 4901 . . . to control chemicals added to food . . . until he sees how Congress takes to the bill to control pesticides remaining on or in foods. HR 4901 was introduced last session and is still in the House Interstate Commerce committee.

Reaction to the bill was strongly favorable from several key congressmen, but no one would hazard a guess as to whether it would be approved this session.

Rep. Miller says that under the provisions of the new bill . . . "no product could be placed on the market unless a tolerance is first established." He also pointed out that "industry has been quite careful to insure that the products they place on the market are not dangerous to public health."

Benefits of the bill, Miller told Congress, are these:

"The food consumer for the first time would be assured that a tolerance assur-

ing safety has been established for every pesticide chemical used in the production and storage of the raw agricultural commodity.

"At the same time, chemical manufacturers would have standards upon which to base recommendations to the grower in the use of these chemicals, and the grower would not have his products confiscated because he did not know the tolerance for the various chemicals. . . .

"The Department of Health, Education and Welfare would have a definite standard to carry on its enforcement responsibilities as regards to a safe food supply under the Federal Food, Drug and Cosmetic Act."

Ban Due on Coal-Tar Dyes

Look for a ban soon on coal-tar dyes now used in coloring of oranges. Food & Drug Administration hearings last month brought out government evidence that dyes known as FD and C No. 1 and 2 and Red No. 32 are "not suitable for use" in foods, drugs and cosmetics.

FDA study into the orange dyes was started several years ago when medical reports of serious effects on children eating candy colored with the dye received publicity in the press.

These studies, made over a two-year period, are the first "chronic toxicity" tests conducted on the dyes since the inauguration of their use in foods, candies, and drinks.

This one should be watched carefully . . . for what it may indicate for the future. Results of FDA studies indicating these dyes may be harmful, after so long being considered harmless, are expected to spur research into other such chemicals, according to FDA insiders. New dyes to accomplish the purpose of other dyes which may be discredited very likely will be in demand.

Note: FDA is concentrating on more "chronic" toxicity tests . . . de-emphasizing "acute" tests . . . in determining what chemicals may go into foods and what may not.

Troubles for Farm Program

Eisenhower-Benson farm program is headed for big troubles. Opposition to "flexing" of price supports is snow-balling . . . indicates defeat not only for Secretary Benson but for the President who has decided to shoulder most of the responsibility. Ike endorsed the flexible support principle and decided to push it now, rather than wait until after the 1954 congressional elections, against the advice of some political advisors.

Why politicians will reject the heart of the Administration program: Risk is great that farmers would react negatively at the polls in November . . . against the GOP. Farm prices continue downward and removal of fixed price guarantees could be expected to anger farmers. This is a big chance to take when control of the Congress is at stake.

What the program would do: Beginning in 1955, corn, cotton, wheat, rice and peanuts, five of the six "basic" commodities, would begin moving down from present fixed 90 per cent parity supports. Benson admits it means lower supports and market prices for farmers, but thinks farmers will go along if they are "educated" on the desirability of cutting supports. High, fixed supports are blamed for the serious surplus problems existing . . . they encourage production for government storage not for consumption.

About half of the current government-held surpluses would be "insulated" . . . kept apart from the market. Intention is to remove price-depressing influences of surpluses. But many congressmen doubt that a "paper maneuver" declaring some surpluses as, in effect, not existing, would remove market jitters.

Ike on conservation is a little more palatable to farm state congressmen: He promises more funds for conservation payments to help farmers switch from cash crops under production controls to approved conservation practices. Benson explains that this means more money for ACP. Last year Benson wanted to chop the agricultural conservation program in half, but Congress restored some of the proposed cut.

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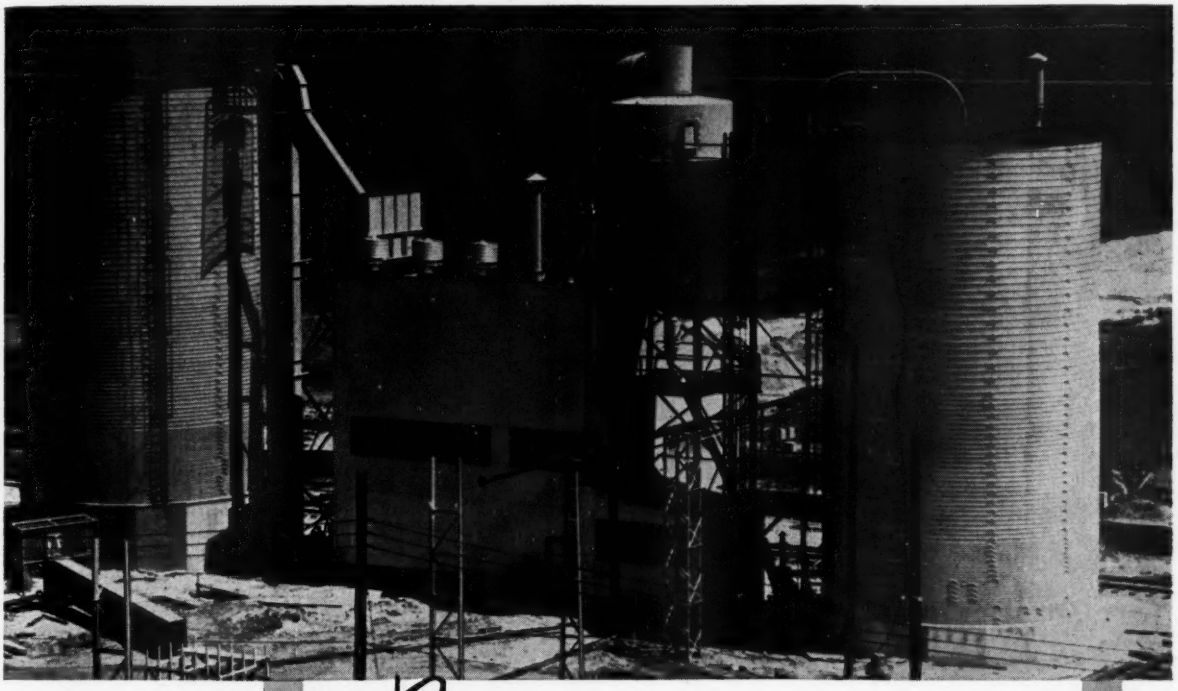

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Bunt-Susceptible Wheat, Smut-Infected Oats in Cooperative Tests of

Seed Treatment Fungicides

TESTS involving seed treatment fungicide on spring wheat and oat seed were discussed by R. W. Leukel in a recent issue of the *Plant Disease Reporter*.

Leukel, pathologist in the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, with cooperators in nine states, carried out a series of field experiments to determine the effectiveness of some newer cereal seed treatments in comparison with several standard materials.

Bunt-susceptible Red Bobs wheat seed was inoculated with bunt of 80 mesh fineness at a spore dosage of one to 200. Oat seed of the Canadian variety, naturally infected with both loose and covered smuts, was also included in the tests.

Test Procedure

A 500 cc sample of seed was used for each material tested to eliminate calculations required by differences

Table 1. Effect of seed treatment of Red Bobs wheat on emergence at 15° C, on subsequent seedling blight in infested[a] soil in the greenhouse at Beltsville, Md. and on infection by bunt in field plots at five stations[b] in 1953.

Seed treatment					Percent emergence in soil		Percent seedlings infected[c]	Percent smutted heads in field plots					
No.	Material	Form	Oz/bu	Active ingredient %	Steamed	Inoculated		Pullman Wash.	St. Paul Minn.	Beltsville, Maryland	Fargo N. Dak.	Madison Wis.	Average of stations
1.	Check	---	--	---	95	85	58.8	81.4	51.0	47.0	4.3	0.8	36.9
2.	Agrox	Dust	0.5	6.7	95	95	1.4	1.9	0.6	0	t	0.1	0.5
3.	Ceresan M	Dust	0.5	7.7	96	94	3.2	0	0.2	0	0	0	t
4.	Mycon	Dust	1.0	7.7	95	91	52.9	12.2	0.8	1.0	t	0	2.8
5.	Mycon	Dust	2.0	7.7	92	83	60.0	0.9	0	1.0	0	0	0.4
6.	Orthocide 75	Dust	.75	75.0	95	94	14.5	32.8	1.1	23.0	0	0.2	11.4
7.	Helixin B[d]	Liquid	2.5	?	41	39	24.6	0	0	0	0	0	0
8.	MEMA[e]	Liquid	0.5	4.0	98	97	14.1	0	0	0	0	0	0
9.	Vancide 51[e]	Liquid	4.0	30.0	96	96	10.7	0	0	0.1	0	0	t
10.	Panogen conc.	Liquid	0.75	2.2	91	90	5.9	0	0	0	0	0	0
11.	Check	---	---	---	97	87	59.8	88.0	47.5	45.0	2.9	0.8	36.8
12.	Panogen[e]	Liquid	0.75	2.2	98	97	12.1	0	0	0	0	0	0
13.	Setrete[e]	Liquid	0.5	7.0	97	88	3.0	0	0	0	0	0	0
14.	Fermuline[e]	Liquid	0.75	8.0	95	92	11.6	0	0	0	0	0	0
15.	Agrox	Slurry	0.5	6.7	89	83	2.0	0	0	0	0	0	0
16.	Ceresan M	Slurry	0.5	7.7	97	97	7.2	0	0.2	0	0	0	t
17.	Mergamma	Slurry	2.0	3.3	89	86	6.9	0	0	0	0	0	0
18.	Mycon	Slurry	1.5	7.7	95	90	51.0	0	0	0	0	0	0
19.	Orthocide 75	Slurry	0.75	75.0	95	93	14.5	31.0	0.4	24.0	0	0	11.1
20.	Orthocide Seed Protectant	Slurry	1.5	50.0	98	91	41.0	19.5	1.2	20.3	0	0	8.2

[a] Soil was inoculated with Fusarium culmorum, F. moniliforme, F. graminearum and Helminthosporium sativum.

[b] No results of significance were obtained at four other stations because of unfavorable conditions.

[c] Data taken 8 days after emergence counts had been made.

[d] Furnished by C. C. Leben. Material was dissolved in ethanol, and failure to aerate seed after treatment caused injury.

[e] Diluted so that 3 cc furnished proper dosage for 500 cc sample.

in the bushel weight of different seed lots. This also avoided errors involved in treating samples of light, chaffy seed as compared with plump, heavy seed.

Four of the fungicides tested were used in both dust and slurry forms; two were applied only as slurries and eight were used as liquid treatments.

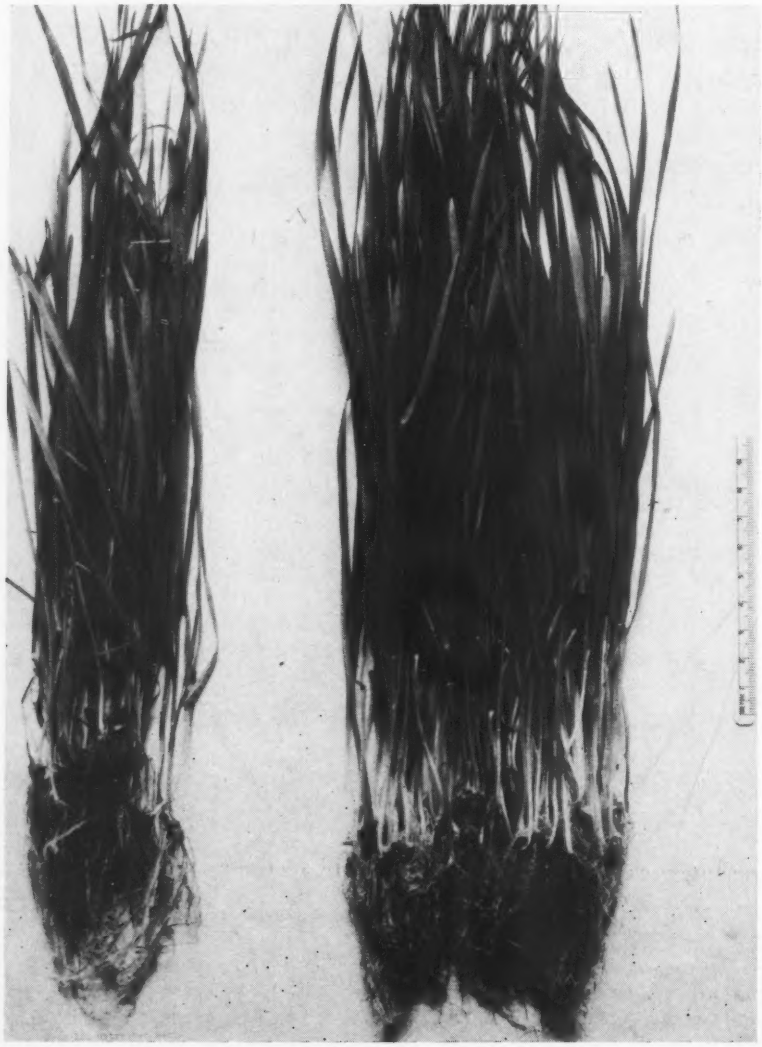
Treatments were applied in glass jars of 1000 cc capacity. Dusts were carefully weighed on a sensitive balance and a pipette was utilized to measure liquid applications. When all fungicides had been applied, grain in the jars was tumbled for 20 minutes in a special motor-driven contrivance.

After the mixing operation, covers were loosened and treated seed was allowed to remain in the jars for at least 48 hours. It was then packeted and sent to the various stations for planting.

A week after treatment, three samples of 100 seeds each from both untreated and treated lots were planted in metal pans containing either steamed, uninoculated soil or soil inoculated with Fusarium species and Helminthosporium sativum.

Pans were placed on wet blotters in large, covered containers and kept at 15°C until emergence. Then glass plates were substituted for the metal covers and fluorescent lights were used to induce normal growth. Emergence counts were made eight days after planting and, after eight additional days, counts were made of those plants showing seedling blight symptoms.

Red Bobs wheat from seed grown in soil heavily infested with Fusarium species and Helminthosporium. Left: Plants from untreated seed showed 63 per cent emergence with a final stand of only 40 per cent. Right: Plants from seed treated with an efficient organic mercury fungicide, 97 per cent emergence and 93 per cent final stand. Each of these tests involved 100 seeds.



Results on Wheat

Only Helixin B affected significantly the emergence of Red Bobs wheat from steamed soil. This material had been applied dissolved in ethanol and injury was attributed to failure to aerate the seed after treatment.

Emergence from untreated seed planted in inoculated soil averaged 86 per cent and 15 of the treatments seemed to increase the percentage of emergence by amounts ranging from four to 11. Again, Helixin B caused a significant decrease because of the alcohol solvent.

Five of the mercurials tested seemed to produce best results in reducing the amount of seedling blight in wheat seedlings grown in infected soil. Vanicide 51 and Orthocide 75, non-mercurial treatments, were less effective and Mycon showed no improvement over the check.

Complete control of bunt at all five stations providing data was obtained with Helixin B, Mema, Panogen, Setere, Fermuline and slurries of Agrox, Mergamma and Mycon. Infection was reduced to less than 0.1 per cent by Ceresan M (both dust and slurry) and by Vanicide 51. At the other four stations, wheat rust was so severe that data on bunt control could not be obtained.

Oat Smut Control

In Canadian oats, average percentage of smut in untreated seed ranged from 16 per cent to less than one, averaging 8.6 per cent for the eight responding stations.

Panogen and Ceresan M slurry eliminated smut in tests at all eight stations; Ceresan M dust, Helixin B and Mycon slurry reduced infection to 0.1 per cent or less and five other treatments averaged less than one per cent.

From "Cooperative Tests of Seed-Treatment Chemicals on Spring Wheat and Oats in 1953," by R. W. Leukel, PLANT DISEASE REPORTER, *Dec. 15, 1953, Vol. 37, No. 12.*

Table 2. Effect of seed treatments on infection by loose and covered smuts in Canadian oats, grown from naturally-infected seed, treated as shown and sown in field plots at stations in eight states during 1953.

Seed Treatment				Percent of heads smutted								
No.	Material	Form	Oz./bu.	Urbana Ill.	Pullman Wash.	Beltsville Md.	Brookings S. Dak.	Blacksburg Virginia	Madison Wis.	St. Paul Minn.	Fargo N. Dak.	Average
1.	Check	---	---	12.0	12.8	11.0	6.5	9.0	6.4	3.8	0.3	7.7
2.	Agrox	Dust	0.5	0.6	1.1	0	1.5	0.5	0.1	0.6	0	0.6
3.	Ceresan M	Dust	0.5	0	0	0	1.0	0	0	0	0	0.1
4.	Mycon	Dust	0.5	3.1	6.0	0.7	2.0	2.5	0.9	0	t	1.9
5.	Mycon	Dust	1.0	0.4	0.4	0.1	0.5	0.2	0.4	0.4	t	0.3
6.	Orthocide 75	Dust	0.75	2.2	4.7	3.0	3.0	3.0	1.1	0.4	t	2.2
7.	Helixin B[a]	Liquid	1.5	0	0	0	1.0	0	0	0	0	0.1
8.	MEMA[b]	Liquid	0.5	1.2	0.8	2.0	1.5	1.0	1.2	1.8	t	1.2
9.	MEML[b]	Liquid	0.5	0.3	0	0.1	0	0.2	0.1	0	0	0.1
10.	Panogen (con.)	Liquid	0.75	0	0	0	0	0	0	0	0	0
11.	Check	---	---	20.1	11.4	9.0	10.5	7.0	9.1	7.2	0.6	9.4
12.	Panogen[b]	Liquid	0.75	0	0	0	0	0	0	0	0	0
13.	Setrete[b]	Liquid	0.5	1.1	0.1	0.1	0	1.0	0.6	0.6	0	0.4
14.	Mercusol[b]	Liquid	0.5	7.5	6.8	3.5	6.5	4.0	2.2	1.4	t	4.0
15.	Agrox	Slurry	0.5	2.5	3.4	0.4	2.5	2.0	0.8	0	t	1.5
16.	Ceresan M	Slurry	0.5	0	0	0	0	0	0	0	0	0
17.	Mergamma	Slurry	2.0	0.3	0.6	0	0.5	0.2	0	1.0	t	0.3
18.	Mycon	Slurry	1.5	0	0	0	0	0	0	0.2	0	t
19.	Orthocide 75	Slurry	0.75	5.2	3.7	3.5	5.0	2.5	1.5	1.8	t	2.9
20.	Orthocide Seed Protectant	Slurry	1.5	3.8	5.6	2.3	4.0	2.5	1.9	2.2	0	2.8

[a] Supplied by C. C. Leben

[b] Diluted so that 3 cc contained proper amount of chemical for 500 cc sample of seed.

Results obtained with Agrox, Mycon and Orthocide on wheat and Ceresan M and Mycon on oats seemed only faintly to support the belief that such treatments are generally more effective when used as slurries and when applied in dust form.

Materials Tested

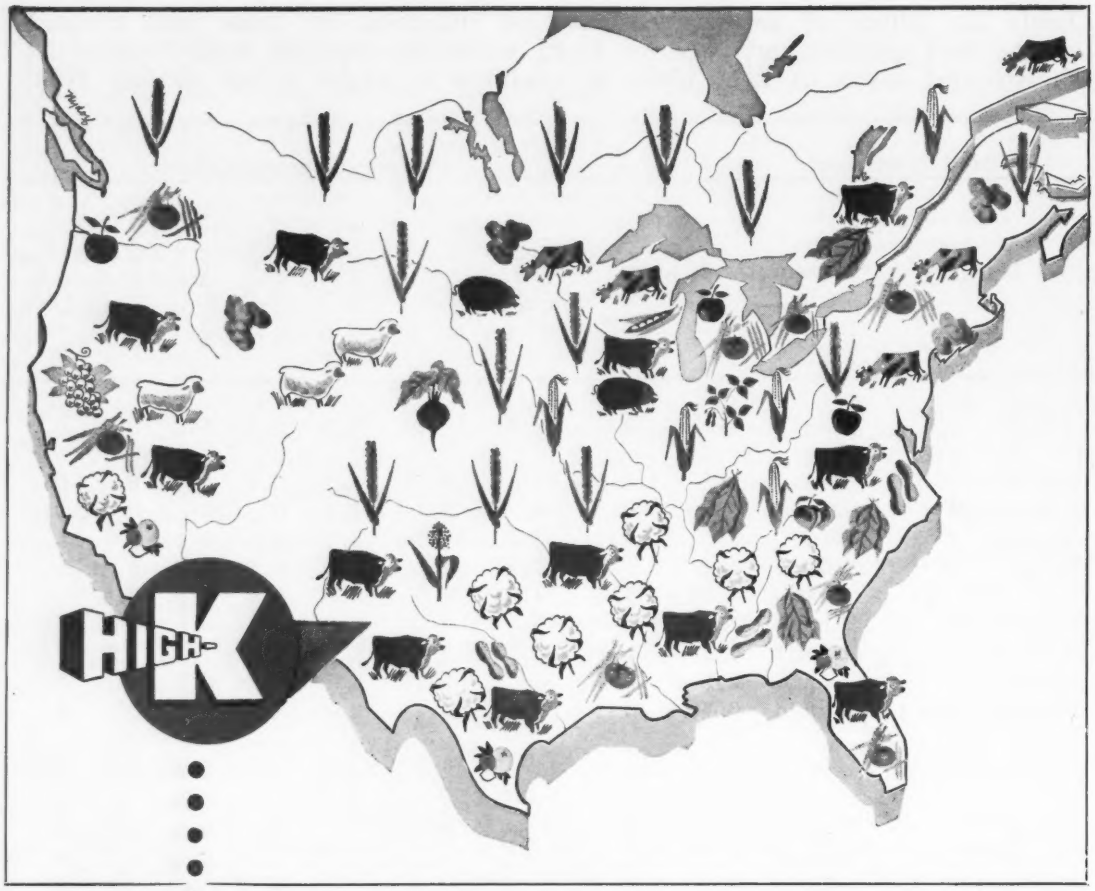
Materials tested in these experiments, and the manufacturers included: Agrox, Mergamma, MEMA, MEML (Chipman Chem. Co., Inc.); Ceresan M (E. I. duPont deNemours & Co., Inc.); Mycon (Pittsburgh Coke & Chem. Co.); Orthocide and Orthocide Seed Protectant (Cal. Spray-Chem. Co.); Helixin B (supplied by C. C. Leben, Madison, Wisc.); Panogen (Panogen, Inc.); Setrete (W. A. Cleary Corp.); Mercusol and Fermuline (H. L. Woudhuysen & Assoc.) and Vanicide 50 (Niagara Chem. Div., Food Mach. & Chem. Corp.).

Price Data

Information received from producers of seed treatment fungicides in response to a questionnaire sent out by Mr. Leukel, indicated prices for mercurials in dry form range from about $1.10 to $1.50 per pound in quantities of one pound or less down to 80 cents per pound or less in 50 to 100 pound containers.

Liquid mercurials were priced from $1.25 per pint in one pint containers to 80 cents per pint in 30 gallon drums. Based on these prices, the cost of treating seed, at the rate of one half ounce per bushel, runs from 2.5 cents per bushel to almost twice that amount.

Price data on non-mercurials went from 60 cents to $1.75 per pound in 100 pound containers and from 70 cents to $3.30 per pound in containers of one pound or less. These are usually applied at heavier rates than the mercurials and therefore can be more expensive per bushel of seed treated. ◆



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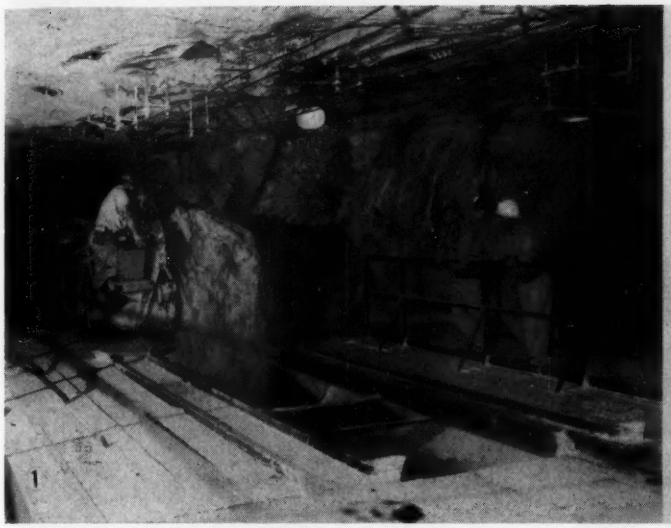
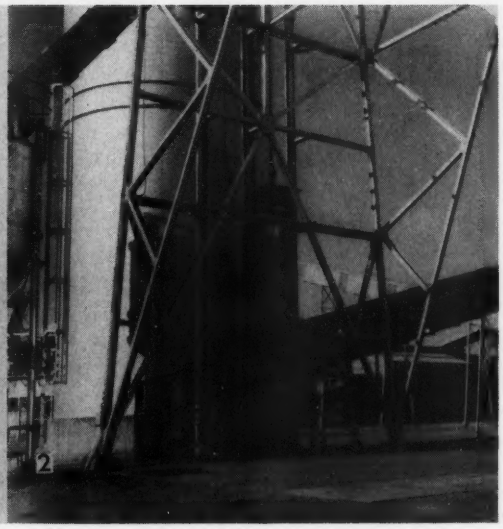


1. John Gasparich, E. P. Berg and C. M. Schloss look on as shuttle car discharges 10 tons of sylvinite into 70-ton capacity steel hopper ahead of manganese steel apron feeder delivering to crusher.



2. Bottom of main head frame, 130 ft. high, for hoisting and discharging balanced 6½-ton capacity potash skips.

Link-Belt writer visits highly mechanized

Duval Potash Plant

AN EXCELLENT first-hand description of potash mining in New Mexico and the part elevating, loading and conveying equipment plays in the process has been prepared by officials of Link-Belt Co.

The Chicago company supplies many farm chemicals plants with materials handling equipment.

The article written by the company has special interest for industry members for two reasons: it provides a resume of the history and problems of potash mining in this country and it tells in detail, with appropriate photographs, the complete automatic handling setup in a typical mine.

Visitors from Link-Belt journeyed to Carlsbad, N. M., and then 27 miles southwest of the city to the Carlsbad Caverns, believed to be the world's largest and deepest, extending to a depth of as much as 1,350 feet below the surface.

Partial text of the story, written by the visitors for *Link-Belt News*, follows:

Potash is being mined underground by five different companies in ever-increasing volume a short distance east of Carlsbad.

While the potash industry in Eddy county, N.M., is barely 25 years old, potash now leads the list of all mining products for the state.

Found in New Mexico, 1925

It was not until 1925 that crystals of the potash mineral Sylvite were discovered in New Mexico, a short distance east of the city of Carlsbad.

This discovery by oil geologist V. H. McNutt of the Snowden-McSweeney Oil Co. was actually made while drilling for oil.

It is this incidental discovery, plus the cooperative efforts of various U. S. Government bureaus, that led to the establishing of the present potash industry near Carlsbad.

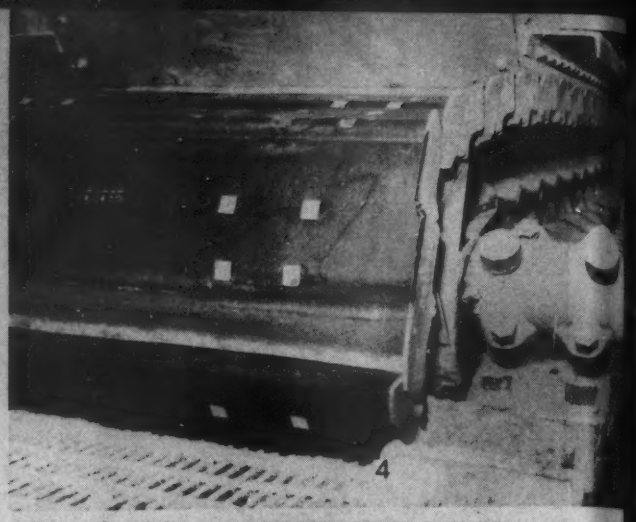
The first company to begin work in the Carlsbad district was the American Potash Co., now known as U. S. Potash Co., which started to sink its first shaft in 1929 and shipped the first potash ore in 1931.

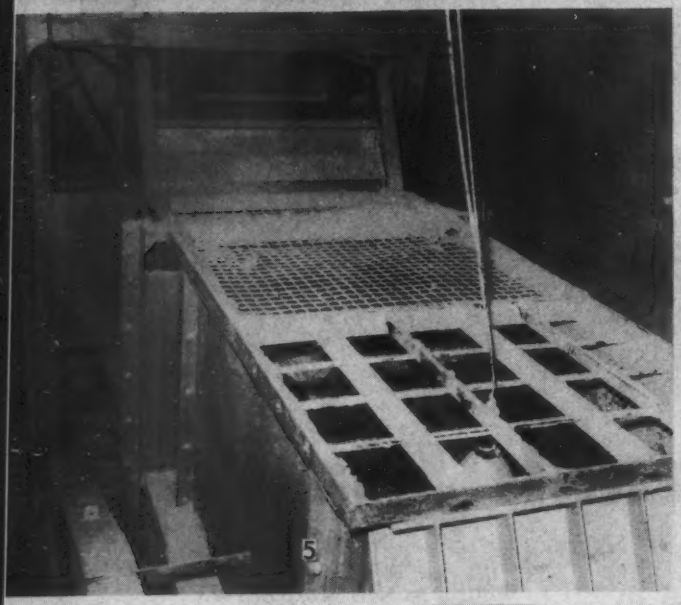
Second and Third Followed

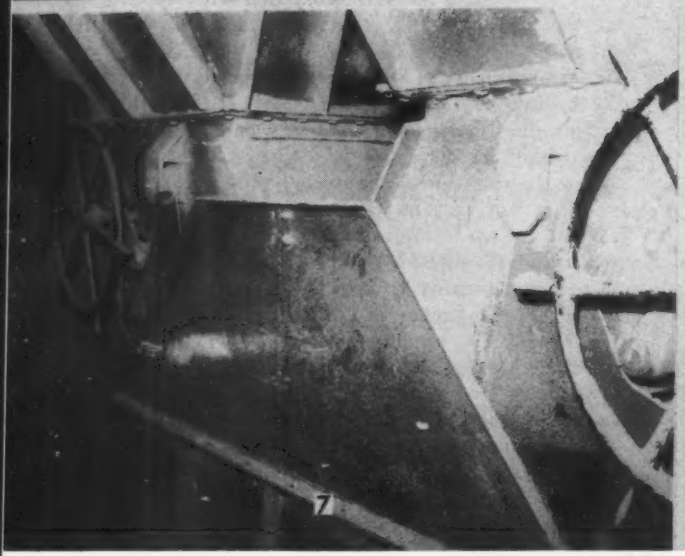
The second company, Potash Co. of America, started shaft sinking in 1933. The third, Union Potash & Chemical Co., now known as Potash division of International Minerals & Chemical Corp., dates its origin to 1936.

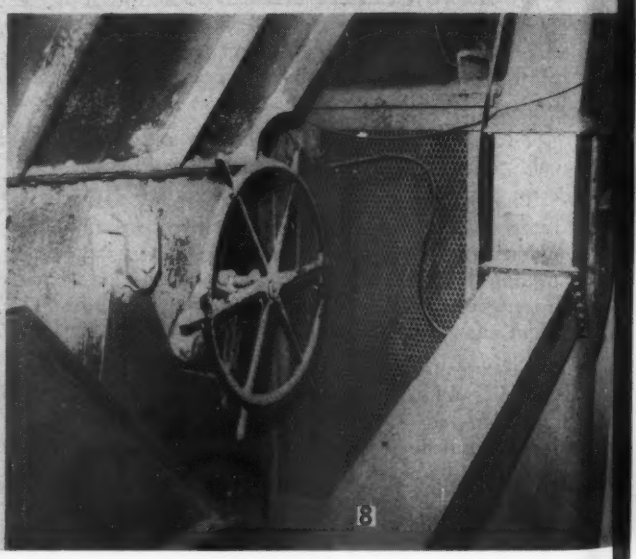
All three companies have meanwhile expanded their operations, and two entirely new mines and refineries entered into production last year in the desert of the Carlsbad district.

These 1952 additions to production were the mine and refinery built by Duval Sulphur & Potash Co.,









3. Steel dump-hopper in mine which holds 70 tons of potash ore or salt.

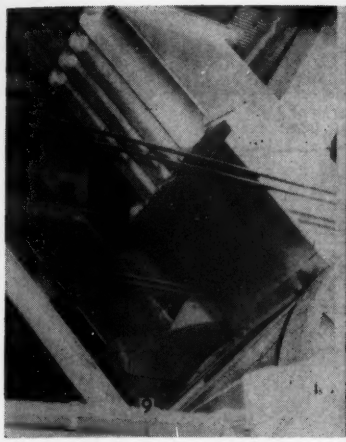
4. Foot end of Link-Belt heavy-duty manganese steel apron feeder from bottom of mine's dump-hopper to crusher.

5. Dump hopper and housing over manganese steel apron feeder for delivering potash to crusher at uniform rate.

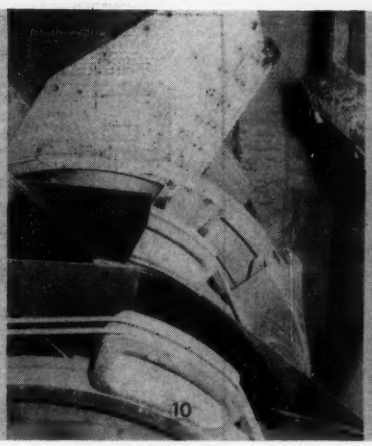
6. Side view of heavy-duty manganese steel apron feeder from bottom of 70-ton capacity dump hopper to crusher.

7. Separate steel hoppers with hand-wheel-operated discharge gates for crushed potash and waste rock salt.

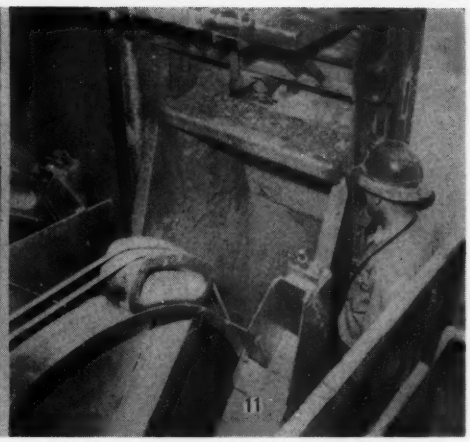
8. Close-up of one of the hoppers (7) and the head of Link-Belt No. 771 continuous bucket elevator in mine.



9. Hopper-chutes from gates under material hoppers to two automatic loaders for balanced skips.



10. Two automatic skip loaders in Duval mine, showing one in position to feed the balanced skip.



11. Link-Belt automatic skip loader in position to feed 6½-ton capacity balanced skip in Duval Sulphur & Potash Company's mine.

Potash division, and the mine and refinery built by Southwest Potash Corp., a subsidiary of American Metals, Ltd.

With these greatly expanded facilities, it is thought that the Carlsbad basin will be producing approximately 90 per cent of the country's total of potash salts for the year 1953.

Duval Sulphur & Potash Co., the first new producer at Carlsbad since 1940, started its new plant in full-scale operation on March 15, 1952.

This is one of America's most modern potash mines and refineries, designed and built by the Stearns-Roger Manufacturing Co., Denver, Colo.,. and it was here that we obtained the accompanying photographs.

Duval's Underground Facilities

These show Duval's underground facilities for receiving the mined ore, crushing and bringing it to the refinery on the surface at the designed capacity rate of 2,500 tons of Sylvinite ore per 24-hr. day.

There are two main shafts, about 300 ft. apart, both served by a common hoist house, which also is the main electric distribution center.

A temporary head frame was used to sink the No. 1 ore shaft. If this had been dismantled prior to erection of the permanent head frame, a serious loss of time would have resulted.

Stearn-Roger's solution was to build the 130-ft. main head frame (See photo) 80 ft. from the permanent site and move it bodily into place when completed.

This is said to have saved more than a month's time in getting the plant into operation.

No. 1 shaft for hoisting ore and waste rock salt is 1,558 ft. deep. The No. 2 shaft, used for handling men and supplies and for ventilation, has a depth of 1,463 ft.

Both shafts contain three compartments and are concrete-lined to the 825-ft. horizon.

Visitors from Link-Belt

It was through the No. 2, West Elevator shaft, that C. H. Schloss, Link-Belt sales engineer, Denver, F. P. Berg, Link-Belt general manager at Pershing Road, Chicago and R. B. Kern, editor of *Link-Belt News*, descended with local photographer, Robert Nymeyer, under the guidance of John Gasparich, mine foreman.

Traveling at 800 ft. per minute, we were down at the bottom in a little less than two minutes, ready to explore the underground workings and make our pictures.

The sylvinite ore, crushed underground to six-in. size and under, is hoisted to surge bin on surface through No. 1 shaft in balanced 6½-ton capacity skips at a speed of 1,160 to 1,175 ft. per minute.

Ore Collection Method

The simplified line diagram shows an accepted method of collecting the ore and waste rock in mine cars, discharging them to underground crusher and automatically feeding the crushed material to balanced skip buckets to be raised to the surface.

In fact, this Link-Belt mechanized handling system is employed in the mines of four out of five potash mining companies in operation in the Carlsbad basin.

At the time our photos were made, the Duval operation was using a Joy 10-ton capacity conveyorized shuttle car to bring the ore from mechanical loader at mine face to collecting hopper, as shown in photograph number 1.

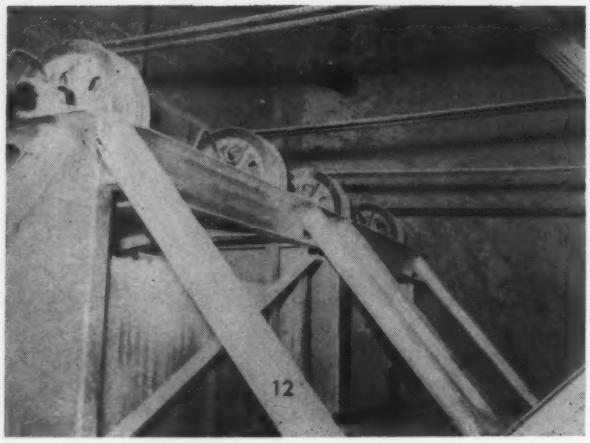
However, since that time, as the working faces of the mine have moved farther away from the shaft, belt conveyors have been installed by Duval, to receive the ore from the shuttle cars near the faces and discharge it into the 70-ton hopper.

The design of handling system is such that a Link-Belt mine car unloader can be installed later.

Bottom of the shuttle car is equipped with a flight conveyor using two strands of Link-Belt conveyor chain, by means of which it discharges the 10-ton load in the photo in one minute.

Duval is mining a nine-ft. thick, practically horizontal load of sylvinite ore at a depth of 1,420 ft. The skip buckets must descend 158 ft. below this to receive their load of crushed ore or waste salt.

The mine operates on double shift; the surface plant on three shifts.



12. Sheave and steel cable arrangement in mine, for counter-weighting the automatic loaders of balanced system.

Diagram of mine with features keyed to illustrations.

The ore or waste rock salt, delivered on different trips, is discharged at mine-floor level into a 70-ton capacity steel hopper.

A heavy-duty Link-Belt manganese steel apron feeder at bottom of hopper carries the material forward horizontally and feeds it into crusher at a uniform rate.

How the Feeder Works

This feeder has 60-in. wide flat-top overlapping manganese steel pans mounted on two endless strands of 12-in. pitch manganese conveyor chain.

The handling capacity of feeder is 330 tons per hour at an apron speed of 8.8 ft. per minute.

The crusher is a 36-in. diam. by 54-in. wide heavy-duty, single-roll machine, very similar to a coal crusher.

Under the crusher are two storage bins, one for holding about 230 tons of potash, and the other one for holding about 150 tons of salt.

A hand-operated flap gate under crusher diverts crushed material to either bin.

The two storage bins are merely pockets which have been excavated in the solid salt, with a concrete partition separating them.

Their bottoms are provided with four steel hoppers and undercut gates, two for potash and two for salt.

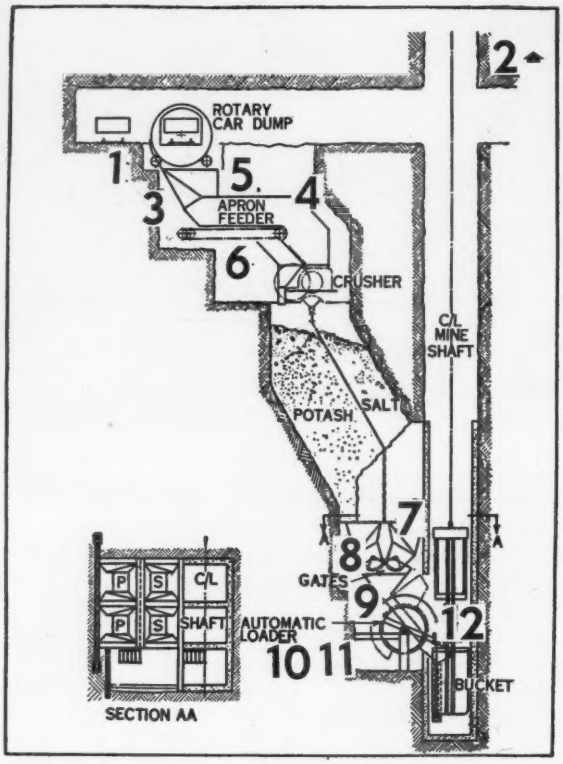
The use of the gates, handwheel-operated, permits loading salt or potash at will.

Two of the three compartments of shaft No. 1 are used for hoisting ore or rock salt. The other compartment serves as a ladderway, pipe line and for cables.

The two hoisting compartments each are equipped with a self-dumping skip of 6½-ton capacity, working in balance.

Sylvinite ore at Duval weighs approximately 82 lbs. per cu. ft, pure rock salt, approximately 10 per cent more.

As the weight of the descending bucket balances that of the ascending bucket, the motor of hoisting machine has only to handle a practically uniform load equal to the weight of the material contained in the ascending bucket.



Automatic Loader Important

The heart of the skip-loading operation is the Link-Belt automatic loader for filling the bucket directly from storage hopper.

The descending skip engages a bail extending across the shaft compartment in which the skip is operating, thus overturning the loader and permitting the material to flow from the storage bin until the damming action in the skip stops the flow and automatically sends the loaded bucket on its way.

Excess material is trapped on the loader and does not spill into the shaft sump. It is retained on the loader until the following cycle, when it is discharged into the skip.

There is, however, also installed a clean-up hopper at bottom of skip shaft to catch any slight dribble, and a Link-Belt 60-ft. high, steel encased No. 771 continuous bucket elevator with screw feeder, to return the dribble automatically from clean-up hopper back to skip loading chute.

The rated capacity of this bucket elevator is 40 tons per hour.

The automatic processes of dumping, crushing and skip-loading entails the services of only one man to operate all shaft-bottom equipment.

Link-Belt Co. designed and built the 70-ton capacity steel collecting hopper; the 60-in. wide manganese steel apron feeder to crusher; the steel loading hoppers and discharge gates below potash and salt storage compartments; the counterweighted automatic damming-type loaders for filling the 6½-ton capacity skips as they come along; clean-up hopper and bucket elevator to skip loading chutes and all steel walkways, floor gratings and handrailings from mine floor level to shaft bottom. ◆

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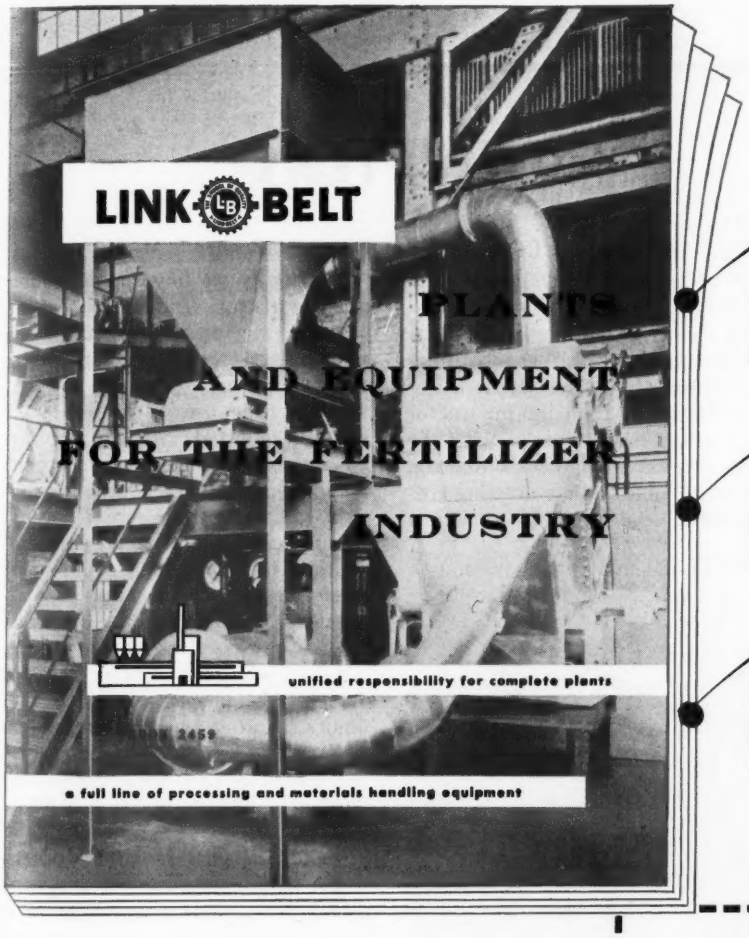

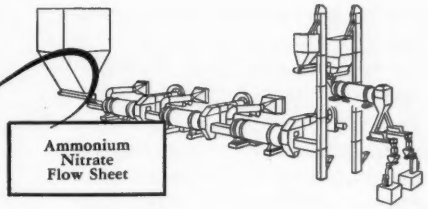

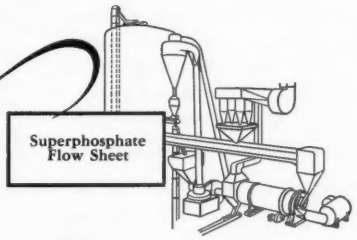

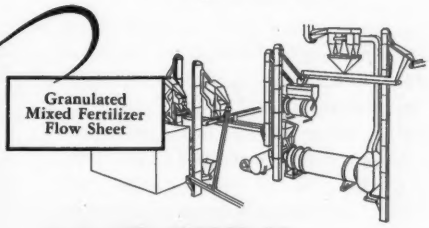

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Cotton Council Agronomist and S. C. Extension Leader Discuss—

Fertilizer P for efficien pr

COTTON

By Leonard Lett
National Cotton Council

WE ALL know that cotton production today is vastly different from what it was 50 years, 20 years or even 10 years ago. It now has become a highly technical operation requiring the use of machines, chemicals and better management. Today's cotton farmer should—though he sometimes does not—get higher production per man and per acre than his father or grandfather.

The modern farmer is constantly on the lookout for new methods and techniques for increasing yields and cutting costs. He gets assistance in keeping his operation up-to-date from the research and educational programs being conducted by our forward-looking public service agencies and energetic private organizations.

One thing he has learned for sure; it pays to add plant nutrients for growing cotton in all areas across the Cotton Belt where adequate moisture is present or can be made available.

Cotton, like all other crops, removes plants nutrients from the soil. Combine this with losses from leaching and erosion and it's easy to see why additional nutrients must be used if plants are to have an adequate supply of food.

Fertilizers Needed

Modern cotton producers do believe in the use of fertilizers. A brief look at the record shows that in 1860, very few farmers were making any attempt to increase their yields by applying chemical fertilizers to their cotton. But by 1922, some 30 per cent of the cotton was being fertilized. And during the past 20 years, cotton fertilization has undergone a really remarkable growth.

For example, 54 per cent of the 26,051,000 acres of cotton under cultivation in 1952 received an application of fertilizer. This year, on a somewhat smaller acreage, 58 per cent received an application. It is also interesting to note the amount of fertilizer being applied per acre to cotton. The average just a few years back was approximately 325 pounds per acre as compared to 355 pounds in 1953.

In areas where fertilizer is used at planting time, equipment now is available in units for one, two or four rows which apply fertilizer simultaneously with the planting operation. The use of fertilizer distributor attachments for tractor equipment has increased with the use of power equipment on cotton farms. Units for side-dressing cotton when needed are also available.

Leonard Lett

Tests, conducted during the past 25 years in cotton producing states on representative soil types, have demonstrated in most cases that better stands of cotton and greater returns from fertilizer will result when application is made at time of planting.

Progress Made

Obviously we have come a long way in cotton fertilization. Just how far we eventually will go in cotton fertilization remains to be seen. A committee of the USDA, studying the use of fertilizers on cotton, reported in 1950 that an average of 14 pounds of nitrogen, 14 of phosphorus and nine of potash was applied per acre. The resulting yield was only 38 per cent of the potential which could have been obtained at the most profitable level of fertilization. So, even on the basis of present knowledge, we can see that cotton growers haven't begun to approach the limits of profitable fertilization.

To what extent will the use of fertilizers in producing cotton be limited? This depends on a number of factors. For one thing, it depends on what research workers learn about the physical and economic limitations of our soils. We already have considerable data on response to fertilizers, and how response is affected by the chemical and physical make-up of our many different types of soils. We've learned what some of the limiting factors are and what to do to correct them in order to obtain better utilization of plant nutrients. And the more we learn the more likely it seems that the limits of profitable fertilization will be moving

(*Continued on page 23*)

Placement
production

Presented at the Fertilizer Application Program sponsored by the Power and Machinery division of the American Society of Agricultural Engineers and the National Joint Committee on Fertilizer Application, in Chicago, Dec. 7, 1953.

SOD CROPS

By H. A. Woodle
Clemson Agricultural College

IN MY section of the country, the Southeast, we have been using relatively large amounts of chemical fertilizers on sod crops, and we have been getting good results for a number of years.

First, I want to emphasize that there are several important factors that must be considered in order to secure efficient use of fertilizer on sod crops: 1. soil type, fertility level and climate, 2. previous cropping history, 3. kind and amount of fertilizer, 4. time of application and 5. method of application.

As I see it, today we are particularly interested in the method of application. Our factual information on the time and method of applying fertilizers is very limited. The need for much more experimental work is indicated.

In trying to learn all that I could on recent developments in pasture fertilization, I have not only studied available published and unpublished data, but have visited all of the southern states and some of the others to observe the results obtained.

Recommendations Vary

Briefly, I have found that the kinds and amounts of fertilizers recommended for sod crops vary widely from region to region, and from state to state. This probably is as it should be because of the variation in soils, climate and plants.

Most states now recommend fertilizers for improved pasturage and hay crops. In practically all cases the use of liming materials is recommended as a fundamental practice to obtain efficient results from chemical fertilizers. In many areas of our country the efficient use of fertilizers depends upon availability of water for irrigation.

More Fertilizer Needed

The trend across the country is to more intensive use of grassland crops. This means that more and more fertilizer must be used to replace the plant nutrients removed in the form of grazing and hay. We must find the most efficient methods for using fertilizers on our grassland crops.

From available evidence, and not considering kinds and amounts of fertilizers, it seems that general fertilizer recommendations for establishing good pastures or sod crops would be the following:

1. Lime as indicated by soil test, working into topsoil well in advance of seeding.

2. Use a suitable amount of starter fertilizer at time of seeding, preferably in bands about one inch below the seed level.

3. Use the best seed available. Drill the seed at ¼ inch depth in a well-prepared, firm seedbed when soil moisture conditions are most favorable and firm the soil over the seed.

4. Topdress with a nitrogen fertilizer when plants are two to three inches high in order to promote growth and quick formation of a vigorous sod.

General Agreement

These recommendations generally are agreed upon, but some agronomists do not recommend nitrogen topdressing. Personally, I believe it is essential, at least in the South. Now let us look at the recommendations for fertilizing established sods. There is no general agreement on this subject.

Again, we find that the kinds and amounts of fertilizers recommended for established sods vary widely. However, we now are concerned with methods of application. Extracts from recent literature are informative:

Extracted Literature

1. **Mississippi** (Wise)—Surface applications of phosphorus to a permanent pasture sod (Dallas, Bermuda, White Clover) were more effectively utilized than were subsurface applications placed at two and four-inch depths, when based on phosphorus absorption data. Recommends that pastures may be maintained by surface application of nutrients.

2. **Iowa** (Pesek)—Comparison of broadcasting and drilling of phosphate fertilizers on established meadows. Broadcasting seems to be a better method of applying the phosphate fertilizer than drilling into the sod, especially in the case of calcium metaphosphate. Decreases in yield of forage because of the drilling were noted in total yield in each of the locations.

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3. **Maryland**, USDA-Beltsville (Wagner and Hulburt)—Most effective method of establishing Fescue and Ladino was the combination of drilling the seed at ¼ inch depth and banding the fertilizer one inch below, with the soil firmed over the seed.

4. **North Carolina** (Woodhouse)—Deep or localized placement of phosphorus had no apparent benefit on established sods.

5. **Ohio** (Davis)—Placing legume seed in a band over a band of fertilizer has given best results. Only a limited amount of work with fertilizer placement on established sod. An experiment on bluegrass sod showed there was no advantage in placing phosphorus four inches deep as compared with surface application.

6. **Tennessee** (Long)—Comparison of subsurface with surface application of phosphate and potash on established pasture sods, using experimental machine developed by TVA which applied fertilizer at a depth of three inches in furrow slices 12 inches apart with little disturbance of sod. Results indicate that surface applications were equally as good, if not better, than subsurface applications.

7. **Virginia** (Rich, Blaser, Obenshain)—Phosphate uptake (Bluegrass) showed 48.6 per cent of the phosphorus obtained from the broadcast fertilizer application as compared to 40.2 per cent for surface band applications and 31.8 per cent when placed two inches deep in bands. Same relative results with White Clover.

The results I have quoted already have been reported. I repeat them because many may not have seen or read them.

Good Response

Last November I wrote all states for their recommendations and observations on methods of fertilizing sod and pastures. The response was good. I have attempted to summarize these replies by quoting extracts dealing specifically with methods of application of fertilizers. I realize the danger of quoting extracts, but I hope that their meanings have not been distorted.

Briefly, an analysis of these recent replies from all sections of the United States as to pasture or sod fertilization shows the following:

1. Much more experimental work is needed on methods of fertilizer application on sod crops. Information also is badly needed as to timing of applications.

2. Rates and kinds of fertilizers vary widely from state to state because of differences in soils, climate and plants.

3. There is general agreement in regard to time and method of applying lime and fertilizers for establishing sod-lime being worked into topsoil prior to seeding, and starter fertilizers in bands just below seed level, or broadcast and worked into upper portion of seedbed, at time of seeding.

4. Many have believed, and some still believe, that it is best to make subsurface fertilizer applications on established sods, but results have proved otherwise.

5. Most states recommend topdressing (surface application) of maintenance fertilizers on sod crops.

6. Some states report trial of equipment intended to apply fertilizers at subsurface levels on established sods, but results were inconclusive and not generally satisfactory.

I may have raised more questions than I have answered, but that is how it looks from this corner just now. ◆

Cotton (*Continued from page 20*)

steadily outward for many years to come.

Studies Being Conducted

We can find a number of fields where studies are being conducted —or could be conducted—that would lead to improved methods of fertilization. Because of the two extremely dry seasons we have had in the area commonly referred to as the rain belt, considerable interest has been focused on maintaining adequate moisture and good physical condition of the soil.

Subsoiling

One practice that is being used by a number of farmers is subsoiling. We have received reports showing remarkable increases in yield of cotton credited to subsoiling. Agricultural engineers at the Delta Branch Experiment Station, Stoneville, Miss., have been getting some very encouraging increases in the yield of cotton in their sub-soiling tests. Other stations have obtained increased yields and better response to fertilizers when deep plowing was performed. It may be possible through additional studies in this field to obtain a greater response to fertilizers by different methods and time of application.

Irrigation

Another practice which is gaining a considerable following in the rain belt is supplemental irrigation. Increases in yield of one-fourth to over one bale per acre have been reported when additional moisture was added. With supplemental irrigation, a grower can use greater amounts of plant nutrients profitably.

Here again, additional information on the best types of fertilizers, time and method of application and improved application equipment will be of considerable help to the farmer. The agricultural engineer, working with other specialists, can play an important part in supplying this assistance.

New Frontier

When we talk about cotton production today, the conversation eventually turns to the West, where irrigation has opened vast new areas of production. Some farmers in this section use very little fertilizer, but others are finding the application of certain plant nutrients very beneficial. This is a new frontier and far too complex for us to explore here at this time. But it will be interesting to observe the trend in fertilizer use in this area.

Studies with radioactive isotopes are giving very helpful information on the developments of

Naco Fertilizer Co.'s new Fort Pierce, Fla. plant, which was designed, constructed and equipped by A. J. Sackett & Sons Co., of Baltimore, Md.

Production Begins at Fort Pierce, Fla.

Naco Plant Opened

PRODUCTION has started at Naco Fertilizer Co.'s new Fort Pierce, Fla. plant, which replaces the one destroyed by fire in November, 1951.

According to the A. J. Sackett & Sons Co., of Baltimore, Md., the Fort Pierce plant is, to the company's knowledge, the first of its kind ever to be "custom engineered" throughout to meet complex manufacturing problems caused by Florida's required multiplicity of grades. Sackett designed, constructed and equipped the new, highly mechanized plant.

The plant has superior facilities for "prescription" orders, of vital importance in a state where it is not uncommon for a fertilizer company to mix several hundred different formulations in a years time. Three large multiple hoppers supply 24 different materials to large Toledo dial scales at the touch of a lever, and then to a four-ton gravity mixer, via conveyors and elevators. Richardson Automatic Pre-Weight Baggers fill the bags for sewing.

Basing is entirely separate from the shipping operations. Another multiple hopper, a two-ton rotary mixer and a system handling nitrogen in liquid forms lay down an ammoniated superphosphate base for curing.

Throughout the plant, materials are handled by payloaders, conveyors and elevators. Reversible shuttle conveyors deliver materials to any bin in the house.

Containing 32,240 square feet of floor space, the Naco plant towers 82 feet into the air and measures 248 x 130 feet. Twenty-eight bins supply storage for 7,000 bulk tons. Within the main building there is space for 1,000 bagged tons. The shipping dock contains space for 500 bagged tons.

The plant is so designed that extensions could be put on each end of the building to accommodate more bins for raw materials. With this addition to storage facilities, the equipment is capable of producing 75,000 tons annually. The plant is equipped for all-weather unloading and shipping, most important in an area where the normal annual rainfall is 55 inches.

A recorder tape gives a permanent record of each material going into a mixer and its weight. This gives the plant superintendent an excellent check for precaution against errors.

W. C. "Chan" Smith will supervise Naco's Florida operation, with offices in Fort Pierce. Naco has plants in both Fort Pierce and Jacksonville. Centralized control, however, will be maintained from the combined general offices of Naco Fertilizer Co. and Thurston Chemical Co., which are located in Joplin, Mo. ◆

cotton roots and when and where the cotton plant utilizes moisture and food in its growth. By knowing the what, when and how of the cotton plant's fundamental processes, we can develop better equipment and techniques for applying fertilizers.

Modern Pattern

In bringing this brief discussion to a close, I would like to give you a general idea of the kind of production pattern modern cotton growers are shooting at. To keep cotton competitive and to continue making a fair profit themselves, growers are looking toward a production pattern geared to mechanization. They know that mechanization, to be successful, demands high stable yields and high productivity per worker. Obviously, proper fertilization must figure prominently in bringing this about.

Mechanization underlines the need for growers to start with a young, healthy seedling that will remain vigorous throughout its life cycle. This means that the soil has to be put into the best possible physical condition, prior to planting a highly viable seed of a recommended variety, at the correct depth and time, so that a healthy, young seedling is produced. To accomplish this, we need to have the optimum moisture, temperature, proper amount of plant nutrients and protection against weeds, diseases and insects. In other words, we should be looking for ways to compensate for unexpected conditions which may interfere with the normal growth and fruiting of the cotton plant.

Teamwork Needed

As the young seedling grows into a healthy plant, these conditions will have to be maintained so that the most profitable yield can be produced. When we are able to do these things in one continual sequence, we can then say that cotton is being produced with maximum efficiency. This is truly a difficult task, but with the geneticist, agronomist, physiologist, agricultural engineer, pathologist, entomologist and others working as a team, I do not see how we can fail. ◆

Friend or Foe?

Your State Safety Dept.

Plant Management Must Demand and Work for Effective Safety Program

By Forrest H. Shuford
Commissioner of Labor
North Carolina

THE spirit of voluntary cooperation is the life blood of a state safety program. Whenever state labor departments are able to secure it, they will be regarded as friends by industry. Conversely, when they fail to secure it, they are likely to be regarded as foes or, at best, as one more governmental nuisance.

A majority of our state labor departments is not doing the safety job it should. I think the fault, in most instances, can be laid squarely upon the doorstep of management.

Failure of Management

In too many instances management has failed to perceive the need for safety work by its state labor department. Whenever management, through lack of interest, is willing to have the promotion of industrial safety left in the hands of a broken down politician or political appointee who has no real knowledge, experience or interest in safety, then the safety work in its state is going to be ineffectual.

Workers will continue to suffer from high accident rates. Management will continue to pay unnecessarily high insurance premiums and will reach the conclusion that because its state labor department is ineffectual in the field of safety, this work cannot be performed successfully by a state agency.

Plant management in most states has the strength and influence to promote any state industrial program it wants. In too many states, however, management has been too uninterested or complacent to serve as the dynamic force behind the creation of an effective statewide safety program.

Small Plants

If the state labor department fails to do the safety job which needs to be done, who is going to do it? You may say that each plant should do its own work in safety. That is all very well for the large and progressive plants which can hire trained, full-time safety directors. But what about the small plants where most of the accidents occur?

These small plants, most of which do little or nothing about accident prevention, are not represented here. They usually do not participate in state or regional safety conferences. They are usually too small to receive special services from the safety engineer of their insurance companies. Unless they have the safety services of an alert and effective state labor department, they are left sitting out on a limb; and the eager beaver of uncontrolled industrial accidents will saw that limb from under them.

Management can secure a friendly state safety agency with a labor department which will furnish the competent professional services in safety which are needed by both large and small plants. It can demand of the state legislature the safety service which it wants: an agency with a competent administrator, adequate and trained personnel and sufficient appropriations for doing the job. If it does this, it is performing a service which will benefit both safety men and the industry of the state.

The results of having such a service then will become apparent. Accident rates and insurance costs will go down. Confidence in the usefulness of the labor department will go up.

Labor departments usually are not created just to serve "labor"; they are there to serve the general welfare, and particularly the welfare of the industrial population, by promoting safe and healthful working conditions.

In the year 1947, the accident frequency rate of all North Carolina industry was 15.5. Five years later, in 1952, the rate was 9.8—a reduction of 37 per cent.

What brought about this substantial decrease in lost-time accidents?

Advisory Board

In 1946 our department initiated the organization of a group of outstanding plant safety directors. We called this group the "Advisory

From a paper delivered during the 41st National Safety Congress in Chicago, Oct. 19-23, 1953.

Board for the Conservation of Manpower in North Carolina Industry." Its purpose was to meet with our safety inspection personnel twice each year and assist us in formulating plans for preventing accidents in our industries on a state-wide basis. About two dozen safety engineers from our larger plants became members of this advisory board.

The general idea of this program was to transmit to industry as a whole in our state the proven safety ideas which had already secured excellent results in the larger plants employing full-time safety men.

The program which our advisory board helped us develop consists of three principal activities: safety awards for outstanding achievements, safety education and special industry drives.

Accident Rate Lowered

The special drives which have been conducted in several of our industries have been outstandingly successful in effecting lower accident rates. By using the service approach—offering industry something which it needs rather than acting as policemen—we have been able to obtain the active cooperation of industry in an overwhelming majority of instances. In cases where there was an industry association, the officers of the association have been very helpful to us in publicizing and encouraging industry-wide safety campaigns.

An example of splendid cooperation between our department and a trade association is the help we received from the Southern Furniture Manufacturers Association in a special safety drive in North Carolina's wood furniture industry. After studying the industry's high accident rate, the high cost of compensation insurance and other persuasive reasons for special safety work, the association sent out letters explaining the reasons for such a drive. This did much to pave the way for our industry-wide inspections.

Throughout the safety drive, it continued to assist in many effective ways. Needless to add, the group was proud of having done its part in this work when, after two years of concentrated efforts, the industry showed a reduction of 43 per cent in its accident frequency rate.

We received similar cooperation from Brick and Tile Service, Inc. and from the North Carolina Textile Manufacturers Association when safety drives were conducted in these industries. A 40 per cent reduction in accidents was achieved in the brick and tile industry. In the Cotton Grey Goods division of the textile industry, there was a reduction of 29 per cent.

Planning Drives

These drives are conducted by our departmental inspection personnel. First, a comprehensive survey is made of the industry's accident experience. Then a training school is held for the inspectors in which they are acquainted with specialized problems of the industry. Next, educational materials are prepared for distribution to management and plant supervisory personnel. Then a number of industry-wide inspections are made over a two-year period, in the course of which outstanding hazards are noted and recommendations are made to correct them. Our experience has been that almost 100 per cent compliance with our inspector's safety recommendations is secured in these drives. Through this kind of cooperation, great progress has been made in the reduction of industrial accidents in North Carolina during the last five years.

The safety awards feature of our program has been received with enthusiasm by industry in our state. Almost 5,000 awards have been won by North Carolina industrial plants in the last six years. In presenting many of these awards in public presentations which are sponsored by local chambers of commerce, we have had the opportunity to sit down with top management and discuss the elements of plant safety. Such meetings have been very enlightening, both to management and to our department.

Cooperation Required

If a state labor department is to fulfill its legal obligations, it must get results in safety. In order to get results, it needs the cooperation of labor, management and the public.

The worker has a right to expect the state labor department to carry out its statutory responsibility in seeing to it that management provides safe and healthful working conditions. The public has every right to expect industrial operations to be performed so as not to endanger the people. But in order to have the cooperation of workers and the backing of public opinion, a state labor department must first have the understanding and support of management in its efforts to secure needed appropriations and personnel.

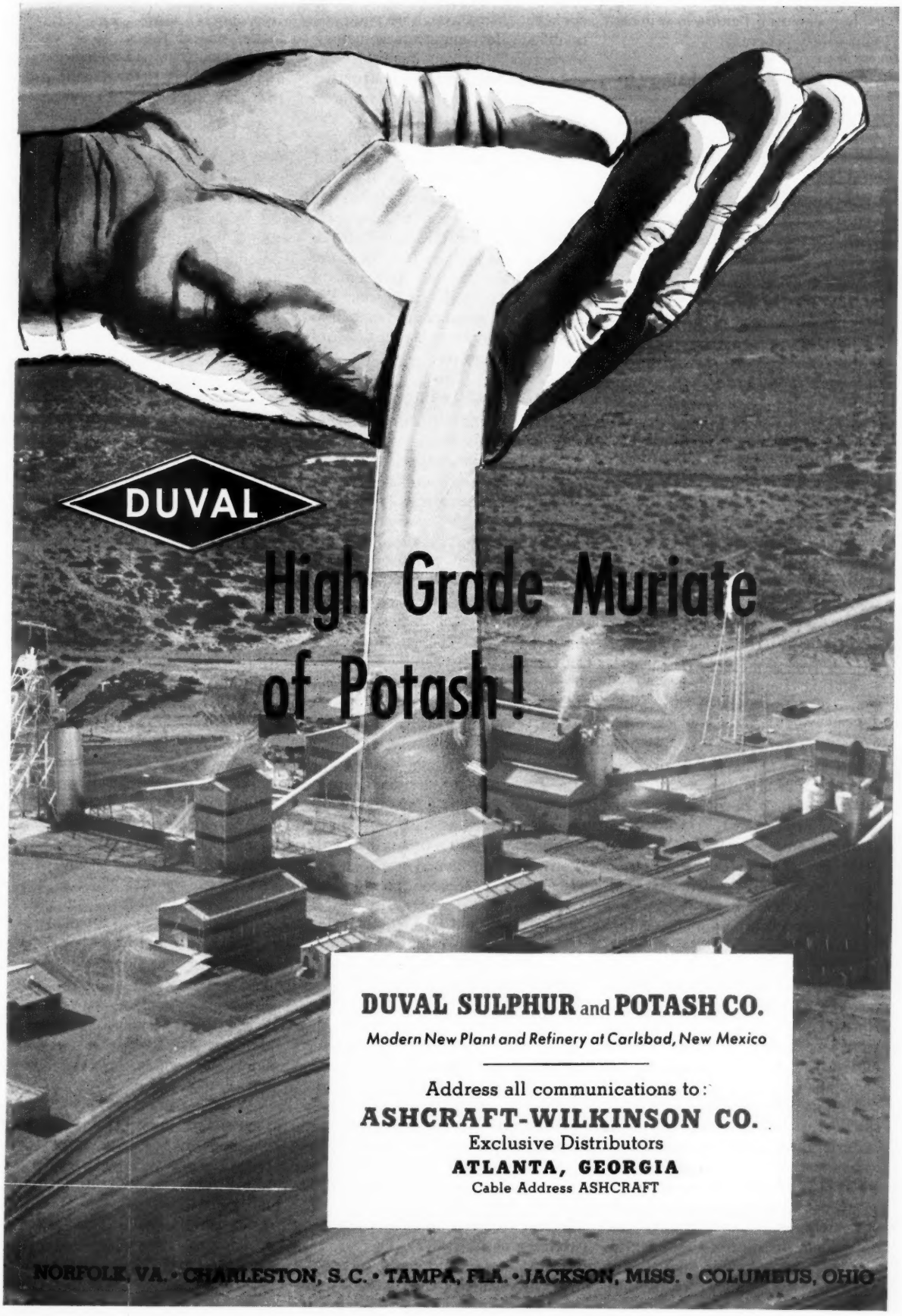
Although our labor departments may have the authority to enforce laws and codes, really effective safety work cannot be accomplished through the voice of authority. It has to be a promotional and educational job. Labor departments must use their authority not as an end in itself but strictly as a means to an end. They must enlist the willing cooperation of management in providing a safety service which will benefit employers and workers alike.

Many times you probably have heard that safety must be "sold" to management. This is true; but in order to sell safety, an inspector must have concrete ideas and recommendations to sell.

For many years, as an administrator of a state safety program, I have had the opportunity to talk with many industrial men about what they need, want and expect from their state labor department in the field of safety. Although their ideas on the subject were expressed in many different ways, they all boiled down to two things which were considered of major importance. First, they thought the state agency must have a concrete and workable plan. Second, the agency must have competent personnel with which to promote and carry out that plan.

Safety Essentials

Through years of experience and contact with some of the best safety minds in the state and nation, and through actual work with personnel from all kinds of plants in promoting safety, we have developed a plan for plant safety which we think is practical and effective. We found that there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are four essential factors in a good plant safety program:

1. **Management must believe in safety.**
2. **Definite responsibility must be assigned.**
3. **A plan of operation must be set up.**
4. **Accident problems must be pin-pointed and a program of correction must be initiated.**

While the emphasis upon specific features of a safety program will vary according to the type of plant, we have found that the following features are necessary in all effective safety programs:

1. **A first aid set-up.**
2. **Good machine guarding.**
3. **Good housekeeping.**
4. **Plant inspections.**
5. **Safety committees.**

With these ideas and plans as a nucleus, individual plant safety programs may be developed to meet the special needs of each plant.

Comments by Ainsworth

At a recent meeting of the coordinating committee of the President's Conference on Occupational Safety, Cyril Ainsworth, of the American Standards Association, pointed out that his sub-committee on small business was appalled by the complete lack of training of state safety inspectors who take examinations for positions. Many state governments have no accident prevention programs, and some of them are actually opposed to having such programs, he said.

Ainsworth went on to point out that inspectors going into industrial plants should have the finest possible training obtainable. He stated that every group within a state has the responsibility of seeing to it that the state safety department is adequate.

Management is even more outspoken about the necessity of a state labor department engaged in safety work having competent personnel. The thoughts of management are well expressed in this statement of Glen Fleming, the able safety director of the Celanese Corp.

"I am reasonably certain that management, generally, would welcome the visit through its plants of qualified safety engineers or factory inspectors. By qualified, I mean inspectors who offer constructive recommendations rather than those who take up valuable time of the plant safety man going through the plant on an educational tour, and who, because of their lack of actual industrial safety knowledge, offer no suggestions for making the plant safer for its employees. State safety inspectors are providing the best answer to the problem of reaching the small employers. We should all support those things which will improve the position of the safety engineer."

Safety Pays

Management must be shown that safety pays in dollars and cents. In one particular plant, an inspector had made numerous efforts to sell its management on the value of accident prevention work, but most of his efforts had fallen short. They continued to be dismissed lightly until finally the inspector succeeded in getting across to the management the fact that a safety program would bring direct economic benefits to the plant.

In this particular plant, the accident frequency was 15. A nearby plant which did similar work and had a good safety organization had an accident frequency of 3. Now the fact that the accident rate in the plant without a safety program was five times as high as the rate of the plant with a program did not convince the management. But when the inspector pointed out that the annual direct cost of accidents amounted to $62,000, while that of the other plant amounted to only $15,000, the management immediately decided to set up a safety program.

As a result of this program, the plant supervisor now is receiving more production and better quality. The workers are receiving the benefit of protection from needless job hazards. In this case, money talked and everybody won. Last year, this plant received a safety award for outstanding work in accident prevention.

Our field representatives report that industrial safety directors often use dollars and cents in reporting the results of their work to top management. I know one furniture plant safety director who makes one of the shortest reports in the country. Once a year he submits to his management a report showing the cost of compensation insurance at the manual rate and then gives the actual direct cost to show the savings.

Another safety director in a textile plant uses the insurance credit which results from an effective safety program in making his reports. He gives the total cost of compensation insurance at the manual rate, then shows the actual cost to his company.

Compensation Rates

One of the most discouraging things is to have an effective program with a low loss ratio and still have to pay high compensation rates because other plants in your industry have unfavorable experiences. In this connection, I want to cite our experience in North Carolina with the furniture industry.

After a two-year special safety drive in our wood furniture industry, the compensation insurance rate for the industry was reduced 15 per cent. This reduction in the insurance rate reflected, in part, the outstanding reduction in the industry's accident rate during the course of the safety drive. It is concrete proof of the direct economic value of a well organized safety program.

An official of a leading North Carolina furniture plant once stated that he thought he would never live to see the day when he would welcome an inspector from the department of labor in his plant. He now not only welcomes the department's inspector, but is himself an active member of our Manpower Conservation Advisory Board. When this official discovered that the inspector was offering a real safety service, he became glad to have him come into his plant.

Whenever management decides to demand and work for the kind of labor department which will serve the safety needs of industry, it will find that its state labor department will be a real friend. This can happen in any state in which an aggressive management becomes aware of the need for safety and decides to do something concrete about it. ◆

Herbicide Advances, Defoliation Techniques Discussed at Recent

Cotton Conferences

NATIONAL Cotton Council staff members had a big week during January with the Southern Weed Conference running from the 11th through the 13th and the Belt-wide Defoliation Conference held on the following two days. Both groups met at the Hotel Peabody in Memphis, Tenn.

Over 300 persons attending the weed meeting heard discussions on several new herbicides and reports from prominent research and industry representatives.

A new cotton defoliant and a different type of defoliant application machine were highlighted in papers read at the second conference at which about 200 persons were present.

Weed Conference

Four DuPont scientists presented papers on substituted urea herbicides which have been under test since 1951 as pre-emergence control chemicals.

They reported that one of the compounds, 3-(3,4-dichlorophenyl)-1,1-dimethylurea, shows considerable promise. A formulation of the material, Karmex DL, will be made available this year in limited quantities to a few cotton growing areas.

The formulation is a liquid suspension containing three pounds of active ingredients per gallon. One gallon of the material, according to the researchers, when properly diluted, will treat six to 10 acres of cotton.

Yields from areas treated with Karmex DL ran equal to or better than those from areas where common control practices were used according to field tests carried out in 11 states during 1953.

Where replanting was required because of weather, no adverse effects were noted on cotton planted after the compound had been applied.

One of the papers reported it was concluded that applications at rates up to four pounds per acre would be reduced to harmless levels within eight to 12 months after application.

In addition to the DuPont studies, the Karmex herbicides have been under test by the USDA and state experiment stations in nine states.

Silvex Introduced

Another new weed killer, trichlorophenoxypropionic acid, was introduced in a paper by Dr. C. E. Fisher, Texas Agricultural Experiment Station. The material is produced by Dow Chemical Co. and has been given the trade name of Silvex.

Dr. Fisher reported that no harmful effects were noted on cotton plants in tests in which the herbicide was applied at rates considerably above the minimum injurious rate for 2,4-D.

Although the material shows definite promise for agricultural application, none will be sold for use on crop lands in selective weed control during 1954.

Most of the current production is expected to be utilized in cotton areas where brush control has been a big problem. All sales will be limited to application by professional operators.

According to Dow scientists, Silvex promises satisfactory brush and weed control for highways, railroad and utility right-of-ways and other places other than cotton areas when carefully used by trained crews.

Delegates to the meeting were also told of Natrin, a compound which is said to show promise as a pre-emergence herbicide and one which is not damaging to plants when applied to the foliage.

Another farm chemical which aroused considerable interest, was a combination of ammonium nitrates plus wetting agents used as a dual purpose herbicide-fertilizer.

The conference was told by V. C. Harris, Mississippi Department of Agriculture, of an experiment showing that so far as the residual effects of herbicides are concerned, cotton planted in treated soils after four years showed no ill effects.

Other speakers at the meeting included Dr. A. H. Moseman, Dr. C. M. Ferguson, Dr. Ennis, Dr. M. T. Goebel, W. G. Westmoreland, W. C. Nettles, F. C. Elliott, Dr. I. E. Miles, T. J. Johnson, E. R. Stamper, Dr. R. P. Upchurch, Dr. W. B. Albert, C. E. Fisher, Dr. Richard Behrens and R. E. G. Rogers.

New Officers

Officers named for the 1955 conference include Dr. W. C. Shaw, USDA, president; Glen C. Klingman, North Carolina State College, vice president and E. G. Rogers, University of Florida, secretary-treasurer.

In his speech, Dr. Shaw stated that "our greatest need now is for close-knit cooperation between research and the farmer." He went on to say that the farm chemicals outlook indicates that improvements in herbicides will come from the four basic chemical groups now most widely used.

Dr. W. B. Ennis, Mississippi Agricultural Experiment Station, president of this year's conference, expressed satisfaction with the progress made in weed

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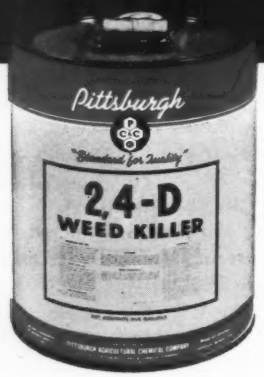

Good 2,4-D sales! They can often brighten your entire farm chemical profit picture! That's why it will pay you to carry a good stock of *Pittsburgh* 2,4-D Weed Killers right through 1954. When you handle *Pittsburgh* 2,4-D, you have a solid, hard-working sales program backing you up every step of the way: (1) Quality-controlled chemicals and fast dependable deliveries because we're a *basic* producer. (2) Assured weed-killing performance in your customers' crops because *Pittsburgh* 2,4-D is *field-tested right in your area.* (3) A complete advertising program to promote your sales—including farm paper ads, literature, window streamers and newspaper mats. The result? Sell *Pittsburgh* 2,4-D and you're sure to "Sell More in '54!" Send for complete details now!

W&D 5030

Standard for Quality

ORGANIC INSECTICIDES: Benzene Hexachloride, Toxaphene, and DDT.

ORGANIC PHOSPHATE INSECTICIDES: Parathion Wettable Powders, Parathion Liquid Concentrate, Systox.

WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, D4 (Low Volatile 2,4-D Ester), C4 Pre-Emergence Weed Killer, 2,4,5-T Formulations.

FUNGICIDES, SEED DISINFECTANTS, COTTON SPRAYS AND DUSTS, AND OTHER SPECIAL AGRICULTURAL CHEMICALS.

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control since the conference was first organized seven years ago.

He said that the cooperation of research, industry, extension and other public services has provided a great amount of know-how with which many notable advances have been made.

"The battle is far from won," he continued, "and we must continue our search for chemicals and the techniques of using those chemicals we now have to do the optimum good."

Exhibits of equipment and herbicide materials placed on the hotel mezzanine and in the lobby by eighteen commercial concerns included a fully rigged tractor and a projector showing continuous weed control movies.

It was announced that St. Petersburg, Fla. has been selected as the site for the 1955 conference.

Defoliation Conference

Speaking before the eighth annual Beltwide Defoliation Conference, O. B. Wooten, Delta Branch Experiment Station, said that amino triazole has shown great promise in most areas of the Cotton Belt as a second-growth inhibitor as well as an effective defoliant.

In his second talk, Wooten discussed a tractor mounted spray rig of different design which has been produced in the grain-grown cotton areas.

Herbert R. Miller, USDA and Robert S. Bone, Food Machinery Corp., reported on a new self propelled spraying machine which has done a creditable job in applying defoliants on the irrigated cotton areas of the West. The unit was designed especially for irrigated cotton areas where the foliage is especially rank and tangled.

Among the other speakers were F. C. Bishop, C. L. Welch, G. B. Crowe, R. F. Colwick, W. L. Giles, H. C. Miller, F. C. Elliott, T. J. Johnston, W. A. Balk, E. E. Berkley and I. W. Bales. Participants in the discussion on desiccants versus defoliants were V. T. Walhood, E. D. Cook, D. L. Jones and John M. Green.

Growth of Conference

In his speech of welcome, Claude L. Welch, director, Production and Marketing division, National Cotton Council, told delegates that the conference has grown in scope and content of its objectives as well as in attendance.

Welch pointed out that the farm chemicals industry has responded to the challenge of defoliation problems by offering an ever widening range in its choice of defoliants.

"Last year," he said, "instead of just one defoliant, we had available 11 basically different compounds which were offered under 18 different trade names.

"Whereas it involved only a few hundred thousand acres in 1947, the practice has now been extended to something on the order of three million acres."

Welch suggested that the "growing-up" of cotton defoliation calls for a corresponding maturity in perspective and suggested that the time has come to give serious thought to determining the areas in which further efforts might be "most productively concentrated."

Education Needed

His first suggestion dealt with providing better methods for bringing available knowledge to the growers in a manner that will enable them to fully use it.

Welch continued, "some of the tragic misuses of defoliants that we hear about simply reinforce the already obvious evidence—evidence that our publicly supported educational programs do not have anything like the resources that are called for in order to adequately guide this kind of technical development into widespread and successful farming practice.

"This weakness, of course, is most conspicuous at that point where the results of our public and private research should logically come in contact with the individual cotton producer—his county agent.

"Here we have a practice the success of which calls for a considerable amount of technical skill in order to time the application to coincide with the optimum conditions which necessarily are specific to an individual farm or a particular field within that farm. And defoliation is but an example of that problem. I mention this for purposes of emphasizing that we all share a vital interest in seeking to strengthen the educational outlet for these increasingly technical developments that are flowing from our research.

"I think we need, and that we can afford to have in every agricultural county, a staff of agents of sufficient size and competence to furnish growers the individual and intimate kind of counsel necessary for translating this new technology into profitable business opportunities on their individual farms.

"As I have said, this is not a problem peculiar to defoliation, but I am convinced that it is a matter of increasing importance to defoliation progress.

More Research Needed

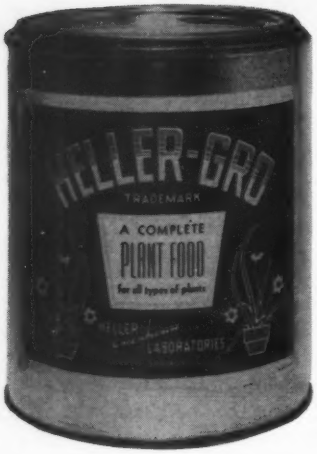
"A second broad area important to the future development of defoliation relates to that vast underlying need to push basic research to the point of revealing the fundamental mechanics of the abscission reaction.

"Third, and closely related, is the continuing need for the discovery of chemical formulations which will insure a more efficient leaf drop without reducing yield or impairing fiber quality—materials tailored still more precisely to satisfying the tremendous range of plant and environmental conditions which occur across the belt each year.

"And fourth, it seems to me that there is urgent need for a strong and systematically organized line of work concerned primarily with the evaluation of defoliation practice—a line of work which has as its main objective a determination of the conditions under which defoliation is technically feasible, and under which it can be expected to pay a net return.

"Are defoliants, or desiccants, being used under conditions which don't actually call for their use? And, will extending the practice to the now untreated acreage actually result in a benefit, or an increased profit to the growers who would be involved?

"It seems to me that we must have clear cut answers to these questions in order to have a sound basis for planning other lines of research, and for developing more effective educational programs." ◆



Paste Fertilizer

Colorado Producer to Expand Distribution of Novel Plant Food

A novel fertilizer product in paste form has been devised by the Heller Greenhouse Laboratories, Colorado Springs, Colo. The formulation, called Heller-Gro, is a 15-15-15 fertilizer with trace elements, packaged in polyethylene tubes and one- and three-pound cans.

This new approach to the soluble, small package fertilizer seems particularly significant in view of the greatly increased interest shown by producers during the past few years. We have seen numerous dry and liquid formulations, but this is the first paste form that has come to our attention.

The material was developed by R. S. Heller, for use in his commercial greenhouses which were operated exclusively under gravel culture methods. After three years of experimentation he developed an original formulation, in liquid form, which was found to produce excellent results with a variety of horticultural crops.

Liquid Was Heavy

Marketed initially as a liquid, extensive distribution of Heller-Gro was handicapped by the weight of the liquid product. After the death of Mr. Heller, his wife took over operation of the company and began a series of experiments aimed at developing a lighter weight product which could be marketed in unbreakable containers. The result of this work is the paste form of Heller-Gro.

The present formulation includes 15 per cent total available nitrogen (organic N from Urea, 10 per cent, and nitrate N from potassium and calcium nitrates, five per cent); 15 per cent phosphoric acid from free acid (liquid phosphoric acid, 15 per cent) and water soluble potash from potassium nitrate, 15 per cent.

USP Chemicals Used

Mrs. Heller says that USP grade chemicals are used to obtain the basic elements and Reagent or Purified grades for trace ingredients.

To produce the paste, ingredients are first weighed, then placed in a blender and mixed to a smooth slurry. This slurry then runs through a unit which grinds at a tolerance of less than .001 inch, binding the ingredients together to form a creamy paste which, Mrs. Heller claims, is completely and immediately soluble.

Containers

A local artist, under the direction of Mrs. Heller, designed the attractive labels which are reproduced on this page. For the household trade, a bright yellow polyethylene collapsible tube with bright green screened label and red cap, is used. The tubes are manufactured by the Elmer E. Mills Corp., Chicago, Ill.

For large quantities, one and three pound cans from Continental Can Co. were selected. These have polyethylene liners to prevent contact between the metal and the chemical contents. They are of the paint can type, so that lids can be tightly replaced when only a portion of the material has been removed.

Expanded Distribution

Mrs. Heller feels that, with the new formulation, permitting comparatively light weight shipments, distribution of Heller-Gro will soon be expanded to a national scale. Distributors are already active in most of the Midwestern states, the Chicago area, Massachusetts, New Jersey, New York, Texas and Oklahoma. ◆

N. C. Pesticide Recommendations

Summary of Major Changes for 1954

CHANGES in pesticide control recommendations for 1954 were discussed at the North Carolina Pesticide School, according to George D. Jones, in charge of extension entomology at North Carolina State College. The school was held on Jan. 19 at the college.

In answer to a request from FARM CHEMICALS, Jones forwarded the following summary of the major changes which includes data on recommended controls for a number of important insect pests:

Cotton Insects

Research work this year indicated that the dosage rates for certain insecticides should be increased. We recommend that aldrin and heptachlor be used at a range of 0.25 to .5 lbs. of actual ingredient per application per acre, and that dieldrin be increased to a range of 0.25 to .33 lbs. per acre.

Endrin has been added for both boll weevil and bollworm control at the rate of .5 lbs. per acre per application. The work with mites showed that aramite should be increased to one lb. of actual material per acre per application.

Tobacco Insects

We have made few changes in our recommendations for the control of plant bed pests. A 10 per cent DDT dust may be used in place of the five per cent dust if the pests show up in heavy numbers. We are recommending a schedule of three treatments for the control of plant bed pests. Flea beetles were especially serious this past year. The last plant bed treatment with DDT will give valuable protection in the field for the first few days, and until the grower has time to make additional applications.

For heavy infestations of vegetable weevil, a one per cent parathion dust will give control. However, where a DDT program is followed in the plant bed, we would not expect trouble from the pest.

For wireworm control we are recommending heptachlor and aldrin in addition to chlordane and lindane as wettable powders. The only liquid concentrate recommended at this time for 1954 is a five per cent lindane transplanting solution.

For green June beetle grubs, mole crickets, slugs and snails a parathion drench is being recommended for the first time in the state.

Perhaps the major change deals with hornworm control. Endrin is tentatively recommended for use at 0.2 to .4 lbs. of active ingredient per acre per application. This new insecticide is available at present only in the liquid emulsion form. TDE still is recommended and has proved to be a satisfactory insecticide when coverage and proper dosage receive close attention.

Fly Control

Recommendations for control of the house fly still will be similar to those for 1953, stressing the following:

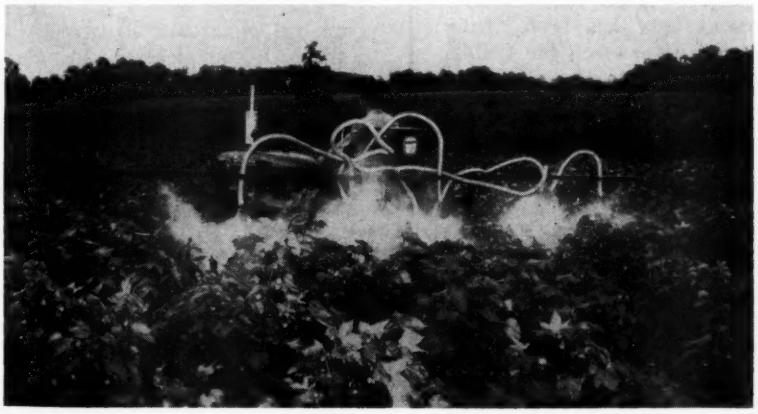
1. sanitation and destruction of fly breeding places;
2. use of screens;
3. use of residual sprays containing DDT, lindane, methoxychlor, chlordane, dieldrin or malathion on those surfaces and in areas where contamination of food or food products will not take place;
4. use of pyrethrum products containing synergists in tight enclosed areas and
5. use of malathion or TEPP baits applied to sacks and floors or other areas where the flies congregate in barns, milking sheds, calf barns, poultry houses and so on.

Fruit Insects

Preharvest application of parathion at six, four and two weeks before harvest are recommended for all varieties of peaches. Sprays formerly were recommended at five and three weeks before harvest. There are only minor changes in the apple spray program.

Vegetable Insects

Malathion as a four or five per cent dust has been included in our 1954 recommendations. This new insecticide offers much promise for the control of aphids, certain mites



Dusting of cotton. N. C. recommendations include aldrin and heptachlor at 0.25 to .5 lbs. actual ingredient.

Notes from Recent CSMA

LEGISLATIVE REPORT

AT THE 40th annual meeting of the Chemical Specialties Manufacturers Association, Inc., W. S. Jessop, chairman of the CSMA Legislative Committee, reported on the work of his group during 1953 and legislation introduced or enacted during that period. FARM CHEMICALS has abstracted from his talk information of direct interest to all pesticide manufacturers.

With regard to the states, 44 state legislatures convened during 1953. Out of these 44, legislative matters concerning chemical specialities arose in 23 states and in Puerto Rico.

Arkansas. A new economic law passed on the uniform bill. Fees are to be set by the State Plant Board. The CSMA counsel appeared and suggested reasonable fees, which possibly may be accepted.

California. An amendment to the Economic Poisons Act raising registration fees 50 per cent.

Colorado. An amendment to the Economic Poisons Act eliminating the maximum fee of $50 and adding a $2 registration fee for brands registered in excess of five.

Florida. A new economic law passed on the uniform bill with average registration fees.

Kansas. A Pharmacy Act was enacted with suitable exclusions for sale of poisons for industrial, agricultural or horticultural use.

Louisiana. After representation by CSMA, its general counsel and several members, a ruling was obtained that no daily shipping notifications were required under the Economic Poisons Act.

Montana. A purely administrative amendment to its Economic Poisons Act was passed without opposition from CSMA.

New Mexico. An amendment to the Economic Poisons Law raising registration fees was passed over CSMA protests.

Oregon. An amendment to its present Economic Poisons Act still maintains high registration fees. From the association's point of view, it is a mosunsatisfactory situation, print cipally because this state does not fall in line with the Federal or the uniform state law.

South Carolina. A bill on economic poisons was introduced and eventually amended in committee to bring it in line with the uniform law. At the third reading, however, several objectionable amendments were added and passage rushed through. CSMA's Legislative Committee has therefore made urgent representations to the governor against his signing the measure. (Ed. Note: This bill was passed after Jessop's report was delivered.)

Utah. A chemical additive in food products bill, to which the legislative committee submitted its usual exclusion amendment, was enacted.

Wyoming. An amendment to the state's Economic Poisons Act was passed after it was amended to bring it in conformity with the uniform bill.

Puerto Rico. An Economic Poisons Law has been finally enacted with which the CSMA committee is in general agreement.

For the future, the association's Legislative Committee looks upon 1954 as being a quiet year as most state legislatures will not be in session. Of the few there are, it is assured that in Georgia, Louisiana and Mississippi no legislation affecting its industry is looked for. ◆

and Mexican bean beetle and seems to be quite satisfactory to use in a combination mixture with methoxychlor for the control of many vegetable and garden pests. Parathion has been replaced by malathion in our new recommendations and is not included for 1954.

Cabbage worms seem to have developed resistance to DDT, hence you will find 10 per cent toxaphene suggested for early applications on crucifers. Two and one-half per cent dusts of both aldrin and heptachlor have been added along with chlordane for cabbage maggot control. TDE has been added for tomato fruitworm control. See Soil Pests for control of wireworms on potatoes (Irish) and sweet potatoes.

Soil Pests

Another very important addition to our recommendations for 1954 involves the use of aldrin, dieldrin, heptachlor or chlordane as soil insecticides for the control of the several soil pests which attack corn, peanuts, Irish and sweet potatoes. These are not to be used on a general "every field" basis but there are fields in many counties where these pests cause very serious damage each season.

While these materials may be mixed with fertilizer, this practice has several unsolved questions. It is believed that growers will prefer to apply the insecticides about a month ahead of planting and work the materials well into the soil. Our recommendations outline this procedure and give rates for the several materials.

Stored Grain Pests

While no new materials or methods have been inserted for the control of pests in stored wheat and corn, we would like all of you to work with your dealers and assist with control work in the counties. Local county agents and ASC officials are working with us in a statewide campaign to assist farmers in this work. Over a million bushels of wheat are on farms in North Carolina and a half-million bushels of corn may be in storage before Spring. Since we have plastic covers in use in many counties for soil fumigation work, the fumigants and the covers may find more use in stored grain pest control work. ◆

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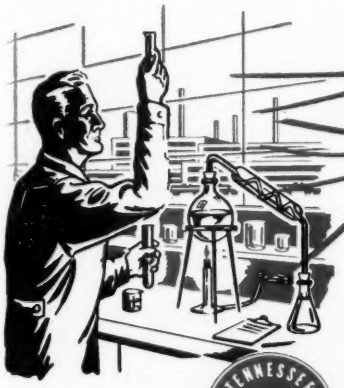
FERRIC IRON SULPHATE

Today's planter naturally plans for the best available production from his land. He knows that minerals in his soil are essential to healthy plant growth and optimum yield of vitamin-rich crops. Thus, the addition of minerals to fertilizer stimulates sales and creates more business . . . through increased production of healthy harvests.

Let us, as basic producers of minerals, point out to you the advantages of mineralized fertilizers and show you how to step up your fertilizer tonnage and profits by adding minerals. You can be sure of uniform quality as well as careful attention to your requirements . . . whether you order a lot or a little at any one time.



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TENNESSEE TRI-BASIC COPPER SULPHATE

TRI-BASIC Copper Suiphate is a chemically stable copper fungicide containing not less than 53% metallic copper. TRI-BASIC Copper Sulphate can be used as a spray or dust on practically all truck crops and citrus crops. Control persistent fungus diseases—correct copper deficiencies from a nutritional standpoint. Use TC TRI-BASIC Copper Sulphate.

COP-O-ZINK NEUTRAL COPPER-ZINC

COP-O-ZINK is a new, neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives a superior performance in control of fungus diseases. COP-O-ZINK composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatable with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.

NU-Z NUTRITIONAL ZINC

NU-Z contains 52% metallic zinc. It is a neutral zinc compound which does not require the addition of lime for direct foliage application. NU-Z gives excellent coverage and adherence to plant foliage, thus rendering it available over a longer period of time. Safe for direct application. For zinc deficiency and plant nutrition—use as a spray or dust.

Overall view of International Min. & Chem.'s Texarkana, Ark. plant. Main storage house and loading docks are at left.

Belt Conveyor System Speeds Operations at

Texarkana IMC Plant

INSTALLATION of an extensive belt conveyor system in the Texarkana, Ark. plant of International Minerals and Chemical Corp. has demonstrated the advantages of such a material handling system to that user and points the way for similar economical installations in the plants of other producers of mineral and chemical fertilizers.

Similar installations have been incorporated in several other fertilizer plants operated by International since its adoption of the original set-up.

Reduced Expense

Among the advantages demonstrated were minimization of labor requirements, increased operating efficiency and more accurate control of material stockpiling. These factors have contributed measurably to a reduced overall operating expense.

International suffered extensive damage from fire at its Texarkana installation and as a result, it was necessary to rebuild virtually the entire plant.

In contemplating the redesign of its operations, the company sought a more efficient means of material handling than by means of the dump cars, loaders and push cars which they had previously utilized. It had found that unit handling was expensive from a manpower and equipment standpoint and further created problems in building and controlling the size of stockpiles for storage and curing of its fertilizer material.

International consulted Barber-Greene Co. of Aurora, Ill., and received its cooperation in the design of a complete conveyor system. This system eventually incorporated permanent, shuttle and portable conveyors as well as some other specialized slat and roller conveyors of other manufacture. Virtually all of the types of raw and finished material involved were found to be suitable for belt conveyor handling.

How it Works

Once out of the den, superphosphate is stored, bagged and otherwise handled almost exclusively by conveyors. At the Texarkana installation, the curing of the superphosphate is carried out in two storage buildings.

The first belt conveyor carries the superphosphate to the first shuttle conveyor which can either stockpile the material in the first building or transfer it to either of two other permanent conveyors which carry the material to the second storage building. There additional shuttle conveyors permit building separate stockpiles throughout the expanse of the storage area.

To minimize wind loss and exposure to rain, the conveyors which pass from building to building are covered with corrugated metal housings.

Basing Operation

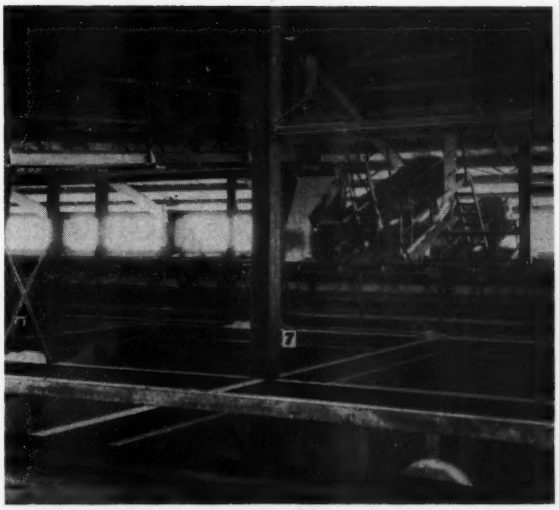
When ready for basing, the super is transferred from the stockpiles to a special eight compartment

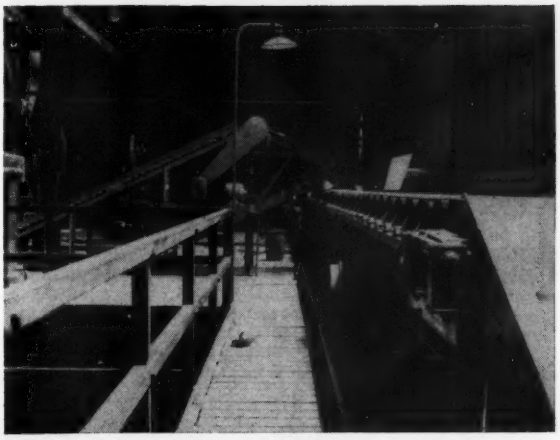
weigh-batch unit where other components of a complete fertilizer are added.

From the weigh-hopper the fertilizer batch is transferred, again by conveyor, to a mixer where ammonia solution is added. Following this, the fertilizer passes through a revolving mixer, rotary cooler and is distributed to its final storage bins by still another conveyor system. A similar set-up of shuttle conveyors is mounted over the bins to provide the establishment of individual stockpiles at varying points.

When final curing has been completed, the fertilizer is carried to the bagging department. Once bagged, it is handled on a combination of slat and roller conveyors and finally to a shuttle conveyor. This unit is movable and can be shifted to any point on the loading floor. A second, self-propelled portable conveyor mounted on four caster wheels is available to load directly from this shuttle conveyor onto trucks.

As a result of the establishment of this extensive conveyor system, a continuous flow of material, from its original receipt until its shipment as finished fertilizer, is maintained. ◆

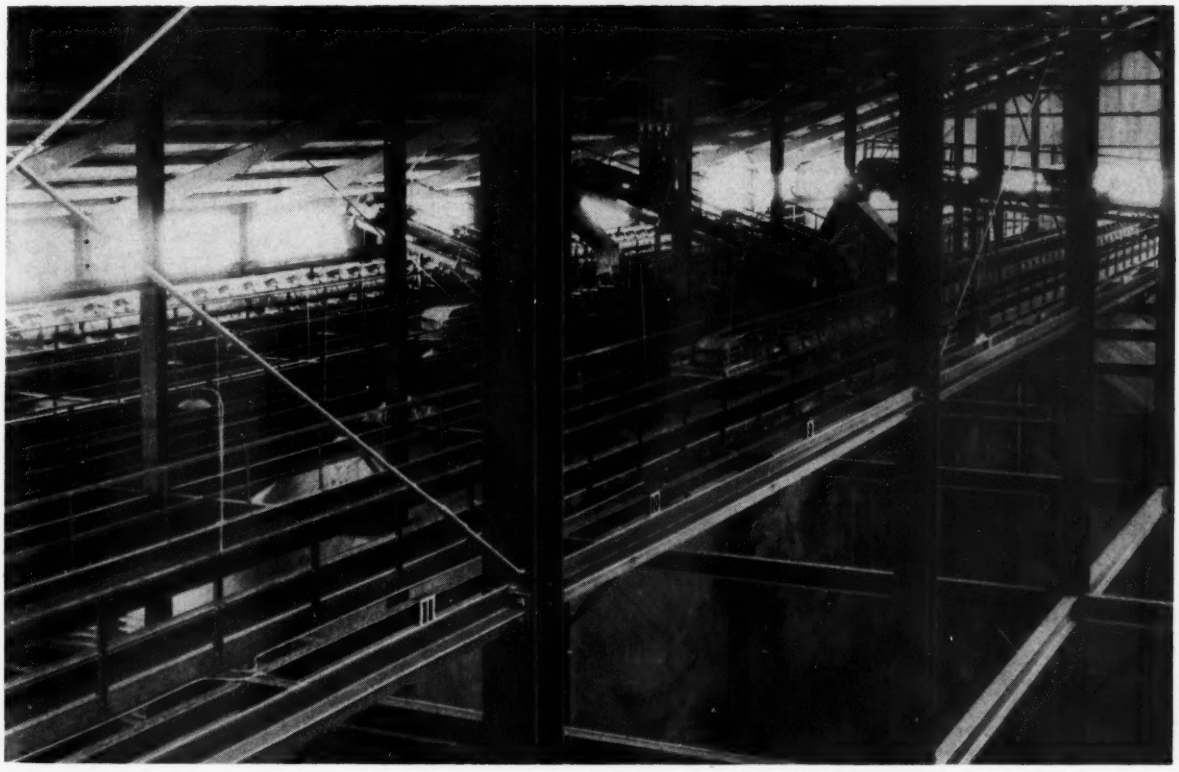




TOP: The "jumper" conveyors which run at right angles to the long axis of the storage building are equipped with trippers which permit them to divert their flow onto any of the several shuttle conveyors, which, in turn, build the stockpiles seen beneath the long belt in the center.

RIGHT: Bags of superphosphate are carried by slat conveyor (left) and deposited onto flat-belt Barber-Greene shuttle conveyor (right). Chute, at the extreme right, carries the bags to a lower floor where the loading dock is located.

BOTTOM: Three main shuttle conveyors, plus the shorter "jumper" conveyors. Electric control panels permit diverting the flow across jumper conveyors to any shuttles.



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Generally, there's not much point in telling people how long you've been in business. But it so happens that the 40 years of Chemico's existence also marks the period of greatest growth of this country's huge chemical industry. Chemico is proud of its part in the development of this industry . . . a development that required more than a little pioneering courage.

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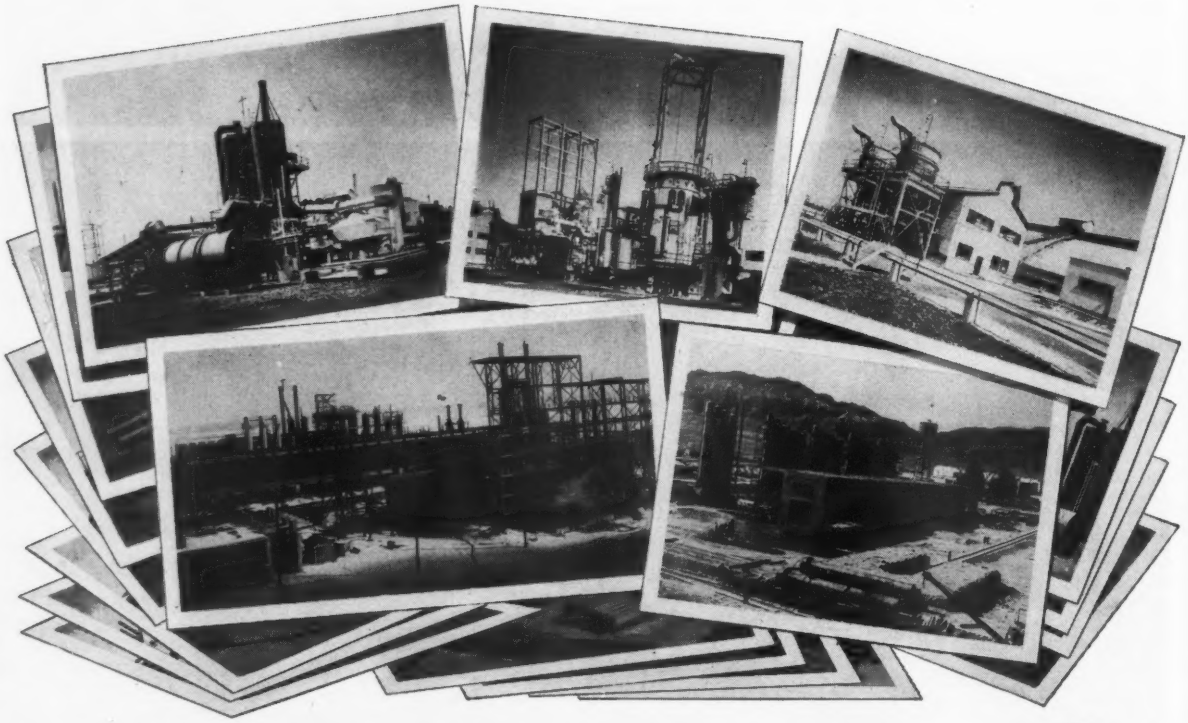

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Industrial News

New Products **New Plants** **New Appointments**

Western Phosphates Plant Opened

NOW producing phosphatic fertilizers for western farmers is the new plant of Western Phosphates, Inc. at Garfield, Utah. Jointly owned by Stauffer Chemical Co. (50 per cent), American Smelting & Refining Co. (25 per cent) and Kennecott Copper Corp. (25 per cent), the project represents a capital investment of approximately $5 million, exclusive of working capital.

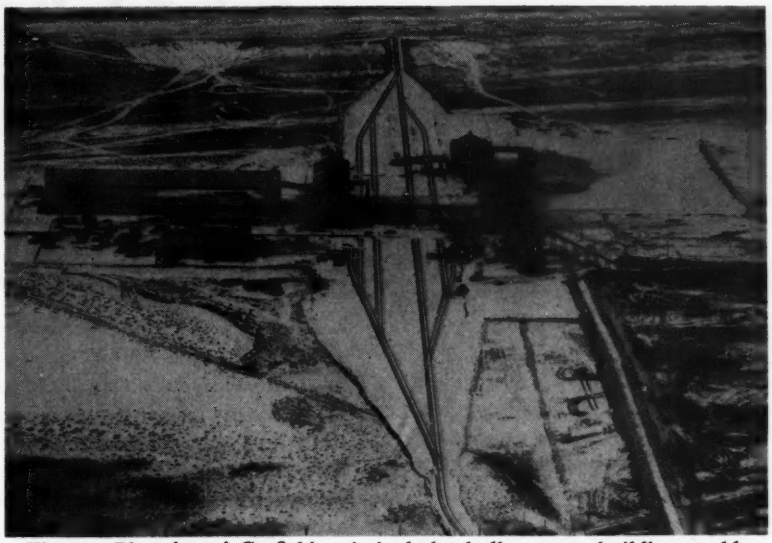
Total annual production is tied to the availability of sulfuric acid and will approximate, initially, 90,000 tons of phosphatic materials. These are: agricultural grade liquid phosphoric acid (52 per cent P_2O_5) for sale as such, ammonium phosphate 11–48 and treble superphosphate (46 per cent P_2O_5). The Wilson & Geo. Meyer & Co., Intermountain will distribute these fertilizers in the western United States.

Of the three products, treble superphosphate will represent the largest tonnage. However, present circumstances do not permit a detailed tonnage breakdown because this will depend upon marketing conditions and experience over the balance of the current fertilizer year.

Future Expansion

The plant has been laid out, and a considerable amount of equipment installed, with a view to a substantial future increase in production should sulfuric acid become available in larger quantities from Garfield Chemical & Manufacturing Co. This company is owned equally by American Smelting & Refining Co. and Kennecott Copper Corp.

Construction, which began in October, 1952, was completed in January. Initial operation of the ore grinding facilities began in December and production of phosphoric acid was started early in January. Next to be turned out was pelletized treble superphosphate with first shipments of aged material scheduled for the early part of February. Production of ammonium phosphate 11–48 will commence in the early Spring. This product also will be pelletized.



Western Phosphates' Garfield unit includes bulk storage building, treble super and ammonium phosphate manufacturing building and (across tracks) Prayton filter building, with rock grinding and storage facilities behind.

Phosphate rock for the operation is shipped from Stauffer phosphate rock properties being operated under lease by the San Francisco Chemical Co. at Montpelier, Ida. Stauffer owns important phosphate ore reserves in this area which are not presently being exploited. Sulfuric acid, the other essential raw material, is delivered by pipeline from the plant of the Garfield Chemical & Manufacturing Co.

The new company will operate as a separate entity rather than as a subsidiary of any of the three stockholding companies. John Paul Jones is the resident executive vice president and general manager and Elwood I. Lentz is plant manager.

Stauffer was delegated the responsibility for design and construction by reason of extensive experience in the manufacture of single superphosphate and other farm chemicals. Similarly, the key management, operating and technical personnel are largely comprised of former Stauffer employees. With a salaried staff of seventeen, the new plant will employ a total of nearly one hundred persons.

Staff Changes Announced

We would like to wish continued success to a mighty nice fellow, Ham Carson, former managing editor of FARM CHEMICALS. **Ham resigned his position effective Jan. 10, to join our fine New York competitor,** AGRICULTURAL CHEMICALS, **as an associate editor. We know that he will continue to do his best in providing good news coverage for the industry.**

George Teel, a member of the FARM CHEMICALS **staff for the past three years, will be our new managing editor with this issue. George is a graduate of Penn State University.**

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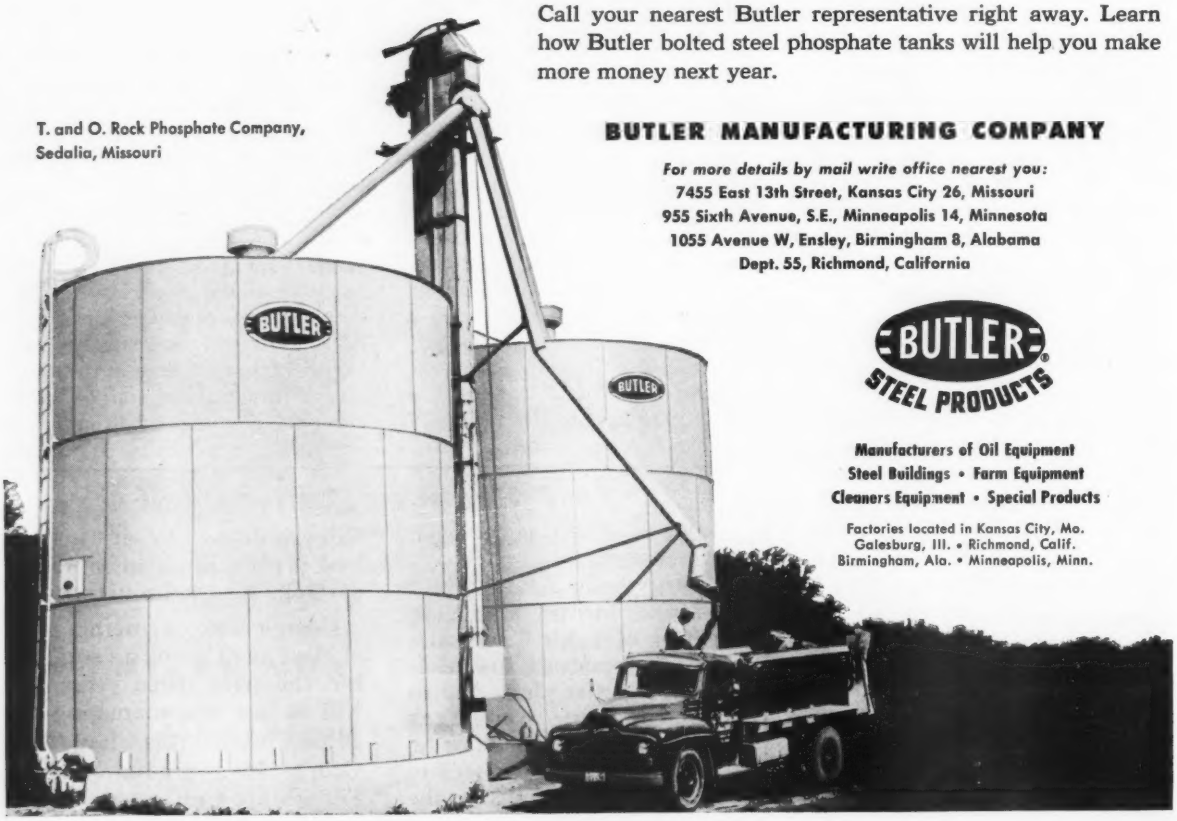

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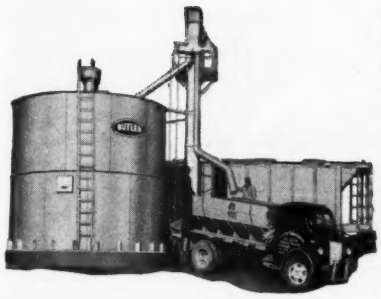

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6412 Riverton, N. Hollywood, Calif. Tel: Sunset 1-0895

IDAHO: Vernon H. Sisco
1207 Arcadia Street, Boise, Idaho. Tel: 3-9961

ILLINOIS: Harold L. Hoppe
1316A West Gift Avenue
c/o University Villas, Peoria 5, Illinois. Tel: 5-8583
R. F. Lambert, Room 1110
624 S. Michigan, Chicago 5, Ill. Tel: WEbster 9-5035

INDIANA: E. C. Komm
P. O. Box 262, Noblesville, Indiana. Tel: 41F31

IOWA: D. Allan Ryals
645 39th Street, Des Moines, Iowa. Tel: 78489

KANSAS, COLORADO: Warren R. Jaillite, Jr.
111 North Main Street, Quenemo, Kansas. Tel: 105

LOUISIANA, MISSISSIPPI: Frank J. Kearny
2414 Octavia, New Orleans, La. Tel: University 1839

MICHIGAN: J. E. Stevens
303 Crossman Street, Williamston, Michigan. Tel: 80M

MINNESOTA: Norman L. Kolbak
2428 Jefferson, Duluth, Minnesota. Tel: 3-7584

MISSOURI: Harry B. Bolte
2 Dorothy Street (Wires), P. O. Box 637 (Mail)
Columbia, Missouri. Tel: 24071
Robert M. Hutchison, R. R. #1, Box 13
Parkville, Missouri. Tel: 4192

MONTANA, WYOMING: R. P. Rodemyer
502 3rd Avenue, Laurel, Montana. Tel: 691

NEBRASKA: James J. Lauffer
226 East Third, Bonner Springs, Kansas. Tel: 94

NORTH CAROLINA, SOUTH CAROLINA: M. T. Harris
4805 Woodhaven Drive, Charlotte, N. C. Tel: 3-1395

NORTH DAKOTA: Richard R. Indergard
308 N. 8th Street, Montevideo, Minnesota. Tel: 9348

OKLAHOMA: L. H. Heiliger
515 N. E. Sixth Street, Bethany, Oklahoma
Tel: Oklahoma City, Whitney 9-4855

SOUTH DAKOTA: C. A. Anderson
1901 S. Norton, Sioux Falls, South Dakota. Tel: 6740

TENNESSEE, KENTUCKY: George E. Gale
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TEXAS: Elmer V. Ledin
4510 Mt. Vernon, Houston, Texas. Tel: Lynchburg 7079
James T. Osborn
1613 Lakeside Dr., Garland, Texas. Tel: Garland 2-8793

WISCONSIN: Harold J. Kramer
4206 Bainbridge St., Madison, Wisconsin. Tel: 4-1737

WASHINGTON, D. C.: F. E. Isemann
613 Cafritz Building, 1625 Eye Street, N. W.
Washington 6, D. C. Tel: Republic 7-7993

WASHINGTON, OREGON: C. L. Miller
4200 11th Ave., N.E., Seattle, Wash. Tel: Melrose 5716

BUTLER MANUFACTURING COMPANY

New Albany Plant Operating

Production of granulated homogeneous fertilizer has started at Davison Chemical Corp.'s new $1 million plant on Grant Line Road, New Albany, Ind., according to J. L. Gayle, plant manager.

In addition to processing and storage equipment, the plant has a modern office building and extensive welfare and shop facilities.

Davison built the plant to replace its fertilizer manufacturing facilities at 10th and River Sts., because the new Ohio river flood wall left the plant between the wall and the river.

Expanded and improved facilities also were desired, the company states, so that it could manufacture the granulated homogeneous fertilizer, which is made by an exclusive Davison process.

Made in the form of small granules, it has the advantage of being dust-free, resisting caking in storage, flowing freely through distributing machinery and having important nutrient advantages when applied to the soil, the company states.

In addition to Plant Manager Gayle, plant staff includes Major W. Hancock, superintendent; W. H. Martin, sales supervisor and Miss Garnett Anshutz, office manager.

D-K Appoints

Robert H. Hessel has been named chief research engineer for Davidson-Kennedy Co., of Atlanta.

In his new capacity he will serve as consultant to the Design, Engineering and Sales departments.

A graduate of the University of Wisconsin in chemical engineering, Hessel also completed post graduate work in Mechanical Engineering.

DuPont Science Funds

DuPont Co. last month made available a fund of $238,500 for grants to universities and colleges to advance the teaching of science.

This new part of the company's program of aid to education is the result of an experimental plan announced last year. Reports coming in from many of the institutions receiving DuPont grants indicate that they have a special need of assistance in the development of science teaching.

Because of this need, DuPont now has made advancement of teaching the largest single part of its aid-to-education program which for many years also has provided grants for fundamental research and postgraduate fellowships.

Under the whole program it has authorized more than $700,000 for the 1954–55 academic year, as compared with $600,000 for the present year. The company is granting $230,000 for fundamental research and $222,000 for postgraduate fellowships in science and engineering.

There are four separate plans in the new development: $100,000 to advance the teaching of chemistry in colleges; $73,000 for postgraduate teaching fellowships in chemistry; $25,500 for summer research grants for chemistry teachers in universities and $40,000 for fellowships in master's degree training of high school science and mathematics teachers.

DuPont is making the new awards to selected institutions, leaving decisions on detailed use of the funds up to them.

'Profit Plugs' Drive By American Potash

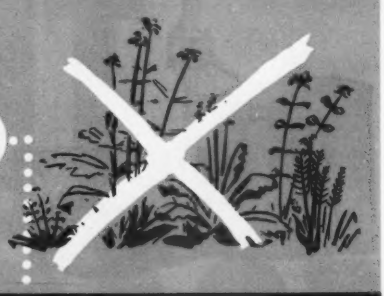
An extensive mail campaign aimed at farmers to promote the sale of "finished" chemical fertilizers has been started by American Potash and Chemical Corp.

The campaign, named "Profit Plugs," is based on statistics which show that agricultural crops become less profitable as certain elements are absorbed from the earth, while the use of chemical fertilizers results in greatly increased crops and profits.

Folders are being prepared which show higher farm profits from the use of plant foods for many crops.

Reason for the action, the corporation states, is that a campaign which ups consumption of fertilizer indirectly results in an increase in its sales since its customers are fertilizer compounding companies.

TRONABOR*



A NEW CONCENTRATED BORATE WEED KILLER

TRONABOR* is a new concentrated borate weed killer containing not less than 13.7% Boron and 44% B_2O_3 combining the properties of a general-contact weed killer and soil sterilant. **TRONABOR** is most effective when applied dry but can also be used in solution as a spray. When you use **TRONABOR** the job is done! Most weed growth is destroyed for a year or longer. Under favorable conditions **TRONABOR** may give control up to three or four years. When applied before or during seasonal rainfall it is dissolved and permeates the soil to the root zone of the plants where it destroys and prevents re-growth until removed by normal leaching. **TRONABOR** is safe, easy to apply, non-corrosive and non-flammable. No other type of weed killer combines so many advantages.

HOW AND WHEN TO APPLY TRONABOR*

In dry form, TRONABOR is easily applied by hand-broadcasting. On larger areas one of several available types of fertilizer or lime-spreaders is recommended. It should be distributed evenly and in sufficient amount. It is better to over- than under-apply, since too little may give unsatisfactory results. Where practical, standing weed growth should be cut to a height of 4 to 6 inches to insure that the TRONABOR is spread evenly. On bare slopes raking in will prevent the material from washing away during heavy rains.

• • • • •

TRONABOR is best applied in the Fall, Winter or early Spring when rainfall carries it into the root area of the soil. TRONABOR must be dissolved to be effective. For annuals and shallow-rooted perennials apply when plants are young and tender. Deep-rooted perennials should be treated in Fall or Winter. Apply TRONABOR at the rate of 7½ to 11 pounds per 100 square feet, depending upon severity of conditions. The higher application should be used on steep slopes, where weed growth is thickly matted or well established, or where the soil is hard and impervious or very sandy or porous. Spot retreatment of some areas at about ½ the above dosages may be advisable later.

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Easy to apply
Concentrated
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Non-corrosive to iron or steel
Non-injurious to clothing
Economical
Soil Sterilant

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Geiger Issues Statement

Good business practice, from every viewpoint, will be rewarded in 1954.

This belief was expressed by Marlin G. Geiger, president of The Davison Chemical Corp. in his 1953 year-end statement.

He defined "good business practice" as including not only diversification but better products, more efficient production and sound aggressive salesmanship."

New fertilizer products, including high analysis and granular plant foods, are influencing the market and justifying the expenditures made in plant improvement, Geiger stated.

Mexican Sulfur Venture

Sulfur properties of Texas International Sulphur Co., of Houston, and Central Minera, S. A., of Mexico City, will be developed jointly, according to terms of an agreement recently signed by the two companies.

Under the contract, the Texas company received the rights to explore sulfur properties of Central Minera, whose contract with the Mexican government permits exploration of 123,550 acres and productions of sulfur from 14,826 acres of Tehuantepec land.

Large commercial quantities of high grade sulfur are believed to be present in Tehuantepec. Several companies have already announced that they plan to erect sulfur processing plants in the area.

Pival to Philippines

The Philippine government has purchased 46,200 pounds of Pival Concentrate, the anti-coagulant rodenticide manufactured by Motomco, Inc.

Purchase was made under the Mutual Security Program and handled by the Philippine Council for United States Aid.

Need for such material is attributed to a land settlement project of the Philippine government, under which large areas have been opened and cultivated for agricultural crops. Corn and rice crops in the area have been destroyed by a heavy infestation of rats and in some cases damage has been up to 100 per cent.

APFC Appoints Garman

APFC president, Paul T. Truitt, welcomes Dr. Willard H. Garman to the association's staff. Dr. Garman's appointment became effective, Feb. 1.

New agronomist for the American Plant Food Council is Dr. Willard H. Garman, former experiment station administrator and soils scientist in the Office of Experiment Stations, Agricultural Research Service, USDA.

Dr. Garman succeeds Dr. John R. Taylor, Jr., who recently resigned to accept a position with private industry.

Prior to his position with the Office of Experiment Stations, Dr. Garman served as head of the Department of Agronomy, Agricultural Experiment Station, University of Arkansas, from November, 1947 through May, 1949. Previously he had been a soil scientist with the South Carolina Agricultural Experiment Station, an assistant and associate professor of agronomy at the University of Georgia and assistant chemist with Texas Agricultural Experiment Station. He served in the Navy in World War II on the staff of Admiral Nimitz.

From 1936 until 1939, Dr. Garman did graduate research teaching at Pennsylvania State College, where he received his Ph.D. in 1939. He was granted his B.S. degree in 1933 and his M.S. degree in 1934, both at Penn State.

He now is chairman of the National Soil and Fertilizer Research Committee, and also is chairman of the Committee on Intersociety Cooperation, American Society of Agronomy.

He has authored numerous scientific articles which have appeared in leading scientific journals and also has written many bulletins in the field of soil fertility.

October Safety Records

Eighty-eight per cent of the fertilizer companies reporting their accident frequency rates to the National Safety Council's Fertilizer Section had perfect records in October, 1953.

Sixty companies had perfect records for the period from January to October, 1953, and 108 had perfect records in October.

Companies working the most man-hours in October with perfect records were Smith-Douglass Co., Baugh Chemical Co. and Virginia-Carolina Chemical Corp.

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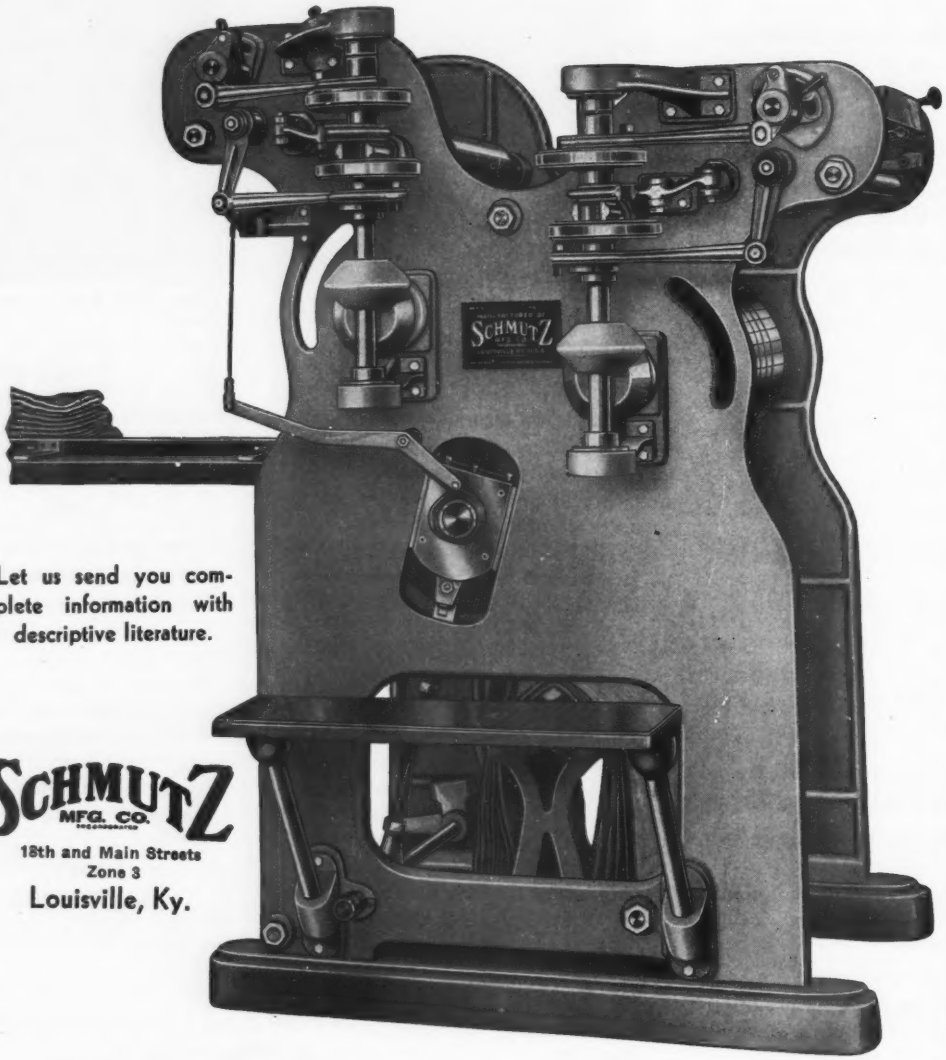
THE MOST MODERN BAG PRINTER

Manufactured in
One, Two, Three and Four Colors for printing made up bags of Paper, Cotton and Burlap, new or used.



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Coronado Selected as CFA Convention Site

The del Coronado Hotel at Coronado has been chosen by California Fertilizer Association board of directors as the location for its 31st annual convention on Nov. 15 and 16.

Four hundred or more persons are expected to participate in this year's business sessions, according to B. H. Jones, CFA president. He said the location was chosen because of its unexcelled facilities and because all delegates can be housed under one roof.

Program and recreation features are being arranged by committees headed by Thomas A. Lathe and Mr. and Mrs. Rod Taft, all of Los Angeles.

Arrangements for room reservations are being taken care of by the hotel.

D. M. Weatherly Co.

An industrial engineering and building firm, D. M. Weatherly Co., was formed on Jan. 1, with home offices at 51 Wiltshire Drive, Avondale Estates, Ga.

This organization will offer a complete engineering service to members of the fertilizer industry, according to D. M. Weatherly.

Another important phase of its activities will be consulting engineering work, including assistance to manufacturers in solving operating problems, preparation of reports, estimates and economic evaluations on plant expansion and improvements.

Prior to organization of this company, Weatherly had been vice president in charge of industrial engineering and construction for the John J. Harte Co.

Distributor Organized

Turf and Horticultural Supplies, Inc. recently was organized in Detroit, Mich. with Ellery W. Jamieson as president and general manager.

The company will occupy a new warehouse, display and office building at 5144 Lawton Ave., Detroit 8, and will distribute fertilizers and pesticides, as well as other agricultural products, to the retail trade in southeastern Michigan and northwest Ohio.

It will represent many leading manufacturers including Stadler Fertilizer Co., American Agricultural Chemical Co., Dow Chemical Co. and DuPont Co.

Officers and directors are Jamieson, president; Philip J. Savage, Jr., treasurer; Geralding King, secretary; Otto E. Anderson and Morville J. Lenover, vice presidents and directors.

Boron Display Cards Distributed by A P & C

Counter display cards showing a conversion table for use in connection with the treatment of boron deficiencies in soil have been prepared by American Potash & Chemical Corp.

W. J. Murphy, vice pres. in charge of sales, and W. J. F. Francis, western sales manager, examine American Pot. & Chem. Corp. conversion table.

The table offers information on the proper amounts of three different Trona products containing the equivalent amount of boron for any given recommendation. The products are Three Elephant Brand Borax (11.3 per cent boron), Tronabor (13.7 per cent boron) and Three Elephant Brand Boric Acid (17.4 per cent boron).

The company is distributing these cards to state and county agricultural authorities along the Pacific Coast, and to its customers, fertilizer dealers and mixers.

Nitrogen Production Up

Nitrogen production throughout the world increased over 11 per cent during the year ended June 30, 1953. according to an annual report of the British Sulphate of Ammonia Federation, Ltd.

Industrial usage rose 14½ per cent and consumption for agricultural purposes, nearly 12 per cent. Although consumption shows a higher rate of increase than production, total supply exceeded demand and a small addition has been made to world stock, the report stated.

Canadian Group to Meet

Canada's minister of agriculture, J. G. Gardiner, is scheduled to speak at the first annual meeting and conference of the Canadian Agricultural Chemicals Association on Feb. 19 in Toronto.

Theme of the conference, "More Effective Pest Control Through Cooperation" will be carried out through a panel discussion and speeches.

The panel discussion on "Major Insect Control Problems in Canada" will be given by members of the Canadian Department of Agriculture's Science Service.

During the afternoon session, Paul Mayfield, NAC president, will tell conference delegates of the "Accomplishments of National Agricultural Chemicals Association in the United States."

Topic of guest speaker Wallace Murdoch, president of Ford Tractor Co., will be "Merchandising to the Farmer."

The importance of "Cooperation in Solving Canada's Major Weed Control Problems" is to be discussed by H. E. Wood, of the Department of Agriculture, Winnipeg.

"Seed Disinfectants" will be the subject of a talk by Dr. A. W. A. Henry of the University of Alberta, followed by C. C. Pettet's views on "Publicity as an Effective Weapon in Pest Control." Pettet is president of the Paint Association.

Agriculture Minister Gardiner will speak at the association's evening banquet.

KNOWING YOUR ONIONS

The secret of the healthy, flavorful onion lies in the productivity of the soil.

This marvelous productivity is kept at high levels through the addition of fertilizers. Many of these modern fertilizers contain potash produced by the United States Potash Company. Potash, a singularly effective ingredient, not only enriches the soil, but protects crops against disease, producing healthier crops and larger yields.

As an investment in the land, potash pays rich dividends in better crops and better business.

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New One-Step Method for Phosphate Determination

A RAPID one-step procedure for orthophosphate determination has been developed by Drs. Allen Gee and V. R. Deitz at the National Bureau of Standards. It is said to combine the simplicity of a spectrophotometric method with the precision of gravimetric analysis.

The method is based on the yellow complex formed when phosphate reacts with a mixture of molybic and vanadic acids. Solutions of the complex are made up to high absorbency in the near ultraviolet and the absorbency compared with that of solutions containing known amounts of phosphate.

A Beckman DU Spectrophotometer with incandescent lamp, a wavelength setting at 390 millimicrons and a slit opening of about one millimeter is used. The wavelength selected permits use of the glass filter supplied with the instrument to take out stray light of wavelengths above 400 mu, which must be eliminated.

Aqueous solutions of ammonium molybdate and ammonium metavanadate, as well as a standard phosphate solution containing perchloric acid, are prepared in advance and kept on hand. The unknown material, ordinarily dissolved in hydrochloric acid, is diluted with water.

Aliquots of this solution are taken which contain amounts of phosphate varying over a small range. At the same time the standard phosphate solution is used to make up two or three standard solutions covering this range.

A solution containing the appropriate amounts of ammonium molybdate, ammonium vanadate and perchloric acid then is quickly added to each flask which holds the unknown or standard solution and the remaining volume is made up with water. A 1 cm absorption cell is filled with the lightest-colored solution and all other solutions are successively placed in a second cell and compared spectrophotometrically with the first solution.

Phosphate content of the unknown solution is interpolated from the absorbencies and known phosphate contents of the standards. A linear extrapolation for measurements not bracketed by the standards can be made, though with somewhat reduced precision.

Under optimum conditions, phosphate concentrations can be compared with a precision of one part in 3,000. Results are thus comparable with the best gravimetric procedures.

With proper dehydration of silica, NBS standard phosphate rock can be analyzed to an accuracy of one part in 1,000. Since few substances interfere appreciably with the absorbency measurement, the procedure should have rather wide application.

European Fertilizer to Korea in Barter

The USDA recently announced two barter transactions involving the exchange of USDA-owned agricultural commodities, to be exported to western Europe, for fertilizer to be used in Korea under the Foreign Operations Administration program.

The barter has been arranged through two contracts between the Commodity Credit Corp. and North American Continental Co., Inc. for the exchange of superphosphate containing approximately 5,400 metric tons P_2O_5 and 30,000 metric tons of ammonium sulfate from western Europe for $2,214,000 worth of CCC-owned commodities.

CCC, in cooperation with the Emergency Procurement Services, General Services Administration, worked out the barter contracts with the export-import company.

New Estonox Formulations

A toxaphene spray, which is said to be highly effective, economical, easy to apply and leaves a long-lasting residual deposit, has been developed by Eston Chemical division of American Potash and Chemical Corp.

Called Estonox, it is available in two formulations—Estonox-40W and 60E—and provides effective control of insect pests under a wide range of conditions, according to the company.

Super Production Up in October

Production of superphosphate in October, 1953 increased five per cent over the September output and decreased 11 per cent from the figure reported for the corresponding month of 1952, according to a report from the Bureau of the Census, U. S. Department of Commerce. The October production amounted to 168,157 short tons.

Shipments of all grades totaled 101,610 tons, or an increase of eight per cent over the previous month's volume and a six per cent decrease for the figure reported in October, 1952.

Stocks on hand at the end of October were one per cent less than those held on the first of the month and three per cent less than quantities on hand as of Oct. 31, 1952.

These monthly figures, the report states, are unadjusted for seasonal variation and number of working days.

New Yale & Towne System

A system which reduces the destructive effects of dust and lint on gasoline engines in fork truck operations has been developed by the Yale & Towne Manufacturing Co.'s Materials Handling division. It is currently available as an optional feature at extra cost.

Seven features of the system which the company says increase truck life are: 1. Precleaner mounted on the top of the hood so that primary air intake is remote from engine air contamination, 2. Air filter designed to meet the added load imposed by contaminated atmosphere, 3. Oil filter which prevents entry of dust and impurities into the engine oil, 4. Floor dust deflector plate which prevents foreign particles from floor surfaces entering from the under side of the truck, 5. Dust enclosed generator and voltage regulator, 6. Crankcase breather air filter and 7. Fluid coupling group which eliminates the ventilation louvers, thereby minimizing the suction effect created by rotating parts.

New Shell Division Formed

G. R. Monkhouse

L. M. Roberts

G. R. Monkhouse, vice president of Shell Chemical Corp., has been appointed to head a new Ammonia division with headquarters in San Francisco. Monkhouse will continue in the capacity of manager of Shell's Western division which will handle sales of all other products.

Operations manager of the new division will be L. M. Roberts, general manager of manufacturing in the company's New York office. He will also be located in San Francisco and will be in charge of manufacturing, distribution and marketing engineering. Roberts will remain as sales manager of the Western division. V. C. Irvine has been named sales manager of the Ammonia division.

In announcing the changes, R. C. McCurdy, Shell president, said that the decision to place all phases of the ammonia business under a unified management was made because of the growing demand for ammonia fertilizer. Shell introduced agricultural ammonia over 20 years ago and pioneered in developing economical methods of application.

Ethyl to Continue Fellowship Program

Ethyl Corp. is continuing its graduate fellowship program for the academic year 1953–54 by supporting fellowships in 21 universities in the fields of chemistry, chemical engineering, mechanical engineering (internal combustion engines) and physics.

A total of $40,000 is contributed for this purpose to cover stipends, tuition and fees. This is in addition to special research projects which are supported at a number of universities.

The fellowship program was initiated in 1938 to encourage development of outstanding research personnel and fundamental research, the corporation states.

Lane Joins MCA Staff

Cleveland Lane, former public relations manager for Pennsylvania Salt Manufacturing Co., last month was appointed assistant to the president of the Manufacturing Chemists Association.

Lane has served on MCA's public relations advisory committee for several years, and for the past two months has been on loan from Pennsalt to direct the association's public relations program.

Prior to joining Pennsalt, Lane had been an account executive in the Public Relations department of Geare Marston, Inc.

Fulton Advanced by V-C

J. Rupert Fulton has been promoted to assistant manager of Virginia-Carolina Chemical Corp.'s Columbia, S. C. sales office. He replaces Paul Renfroe, who was transferred to the Savannah office, as assistant manager.

Fulton represents the third generation in his family who has been with V-C. His grandfather was an agent for V-C fertilizers and his father was first an agent and later a salesman for the Richmond sales office.

CFA Essay Contest

An essay contest on "More Profits from Greater Fertilizer Use" is being sponsored by the Soil Improvement Committee of the California Fertilizer Association.

Eligible for the contest are vocational agriculture students of junior colleges. Vo-ag instructors of 20 California junior colleges have received contest announcements, urging full participation of students in their crops and soils classes.

The rules are simple. Essays are not to exceed 2,500 words, and are to be in CFA's office not later than April 30. Awards will be made before the end of the school year.

Person submitting the best essay will receive $100 and possession by his school of the perpetual trophy for the ensuing year; $25 will be given the author of the best essay in each other school.

Industry Speakers at Chem. Eng. Symposium

Several representatives of the fertilizer industry will present talks at the "Chemical Engineering in the Fertilizer Industry" symposium on March 10 in Washington, D. C.

Speakers and their topics include:

Edwin C. Kapusta, National Fertilizer Association—"Trends in the Fertilizer Industry."

L. D. Yates, F. T. Nielsson and G. C. Hicks, Tennessee Valley Authority—"A Continuous Ammoniator for Superphosphates and Fertilizer Mixtures."

S. J. Martenet, E. Rauh and Sons Fertilizer Co.—"A Continuous Process for Production of High-Analysis Granular Mixed Fertilizers of High Ammonium Nitrate Content."

J. J. Dorsey, Jr., Commercial Solvents Corp.—"A Pilot Plant Study of a New Process for Manufacturing Ammonium Nitrate."

Lucien H. Cook, Chemical Construction Corp.—"The Chemico Urea Process."

J. A. Retzke, G. F. Sachsel and R. B. Filbert, Jr., Battelle Memorial Institute—"Factors Influencing the Changing Technology of the Fertilizer Industry."

The symposium is being held as part of the American Institute of Chemical Engineers' meeting.

Industry Men Join Ag Advisory Group

Three members of the industry, D. W. Brooks, Atlanta, Ga.; Tom Hitch, Columbia, Tenn. and James Hand, Jr., Rolling Fork, Miss., are among the men appointed to President Eisenhower's National Agricultural Advisory Commission.

D. W. Brooks is familiar to all those in the fertilizer industry as general manager of The Cotton Producers Association, a position he has held since the organization was formed in 1933. In 1951 he was elected president of the National Council of Farmer Cooperatives and has been very active in many groups connected with the cotton industry.

In a recent USDA release, Hand is described as one of the organizers and promoters who established the nitrogen plant (Mississippi Chemical Corp.) at Yazoo City, Miss. A leading advocate of mechanized farming, he is said to have the lowest production costs of any farmer in his state.

Hitch, president of the Tennessee Farm Bureau Federation, is a member of the board of directors for Tennessee Farmers Coop. He has served as a member of the Tobacco Advisory Committee and currently is vice president of Citizens for TVA, a group organized in support of the governmental authority.

The commission meets at least once during each quarter of the calendar year to review USDA farm program policies and administration and to advise the secretary of agriculture in regard to such matters.

G. N. Hoffer Receives Holbert Medal Award

Dr. George N. Hoffer, midwest manager of American Potash Institute, recently received the Holbert Medal Award for significant contributions in the field of the plant sciences.

Dr. Hoffer is the sixth man to be so honored since the award was instituted.

In presenting the medal at a dinner meeting sponsored by Alpha Tau Alpha fraternity at Illinois State Normal University, J. R. Holbert, general manager of Funk Brothers Seed Co., cited Dr. Hoffer's technical knowledge and scientific contributions and his value as a leader of men.

Holbert expressed his personal appreciation for all the opportunities given him when he was a student of Dr. Hoffer at Purdue University.

Other men who have also received the award include Dr. W. L. Burlison, former head of University of Illinois' Agronomy department and C. L. Gunn, one of the "hybrid corn makers."

Latest DuPont Booklet

The latest booklet in the "This Is DuPont" series now is being distributed by the DuPont Co.

Called "The Story of Agricultural Chemicals," it tells how science and the farmer in this country have teamed together to produce 50 per cent more food now than 20 years ago.

Ways in which plant diseases and weeds are being conquered by modern science are shown by pictorial journalism in the booklet.

"A single chemist employing the advanced techniques of science provides to the farmer the equivalent of a whole township of workers, at the cost of a few cents," the booklet states.

Partain Sees 1954 as Good Farm Year

Farmers will have plenty of money in the till in 1954, and will spend it on products which are sold the hardest, Lloyd E. Partain, farm market director of *Country Gentleman* believes.

"They will spend $21 billion for production purposes next year," Partain states. "After paying all such costs, they will have somewhere between $17 and $19 billion left to spend as they please—to live on, enjoy themselves or for savings."

Speaking on the farm outlook, he said, "I do not know of a single economist who foresees anything but a high demand for farmers' products and a profitable year for those who have farmers as their customers."

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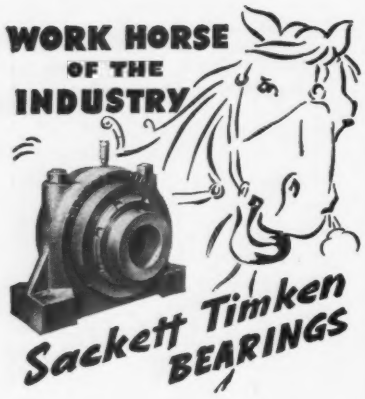

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Top Award to Folium Package

Monsanto Chemical Co.'s Folium Fertilizer package was one of eight winners in the first annual competition staged by the Package Designers Council. Named the "Best New Package for a New Product," it was designed by Rudolf Czufin and Albert Quinlan of Gardner Advertising. The package is produced by Mulligan Printing Co. and Shellman Products Corporation.

Marietta Research Lab

A new research laboratory has been constructed by Marietta Concrete Corp. for testing of company products and the study of new methods for products and quality control.

Of novel construction, the laboratory itself is experimental. It was made with Styrofoam planks lightly nailed to a wood frame. Mesh was then wired in place and a layer of concrete blown on under high pressure. After the concrete set, the woodframe was removed and a layer of concrete blown on to the interior. The resulting wall, Marietta says, has unusually high strength and provides amazingly high insulation.

The company has offered the use of its testing facilities to interested customers.

D-K Gets Contract for Tri-State Plant

Davidson-Kennedy Co. has been awarded the engineering contract for construction of the new Tri-State Co. fertilizer plant in Henderson, Ky. Cost is estimated at $130,000 or more.

All equipment as well as plant design, engineering and supervision of construction is being furnished by Davidson-Kennedy, according to A. T. Kennedy, company president.

The new Tri-State plant will serve an area of approximately 50 miles, and formulas adopted will be designed for usage in the Henderson area. The company plans to manufacture complete fertilizer.

Classified

Wanted: Young College graduate in chemical engineering willing to start in production and work up by a fast growing organization in the Northwest now contemplating expansion in new process developments in the fertilizer industry. Presently operating two plants. Opportunities excellent. Address "440" care FARM CHEMICALS, Phila. 7.

Wanted: Aggressive young man, mid 30's, now employed as superintendent in acidulation and complete fertilizer plant, to develop into assistant to manager of fertilizer division of a fast growing organization in Northwest. Must have good educational background and have clean record of getting things done. Opportunities good. Address "445" care FARM CHEMICALS, Phila. 7.

Wanted: Plant superintendent for acidulator and fertilizer plant in Northwest. Opportunities good. This open position due to expansion in our organization. Address "450" care FARM CHEMICALS, Phila. 7.

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We assist you in the important matter of site selection for your new plant including determination of subsoil conditions.

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We tell you before the contract is signed exactly how much the plant will cost. We protect you against unknown "cost plus" work.

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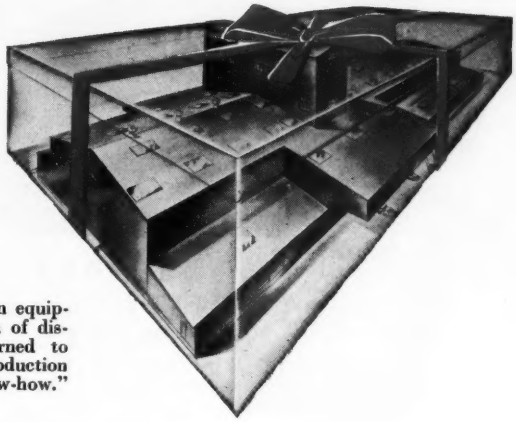
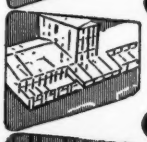
We *custom-design* the building and all production equipment to meet the particular needs of your area of distribution. Further, we leave no stone unturned to incorporate the highest possible degree of production efficiency based on our wealth of specialized "know-how."





4 Building Construction

We construct the building from foundations to roof using the best materials obtainable in each component part. We include all electric power and lighting required including a power room, in which are located all motor controls for protection against usual dust and moisture conditions.

5 Equipment Manufacture

We fabricate in our own shops production equipment of the very latest design. Upon arrival at the site, we install this equipment with highly skilled men under the supervision of thoroughly competent field engineers. Upon completion of this work, each component part is thoroughly tested prior to the plant's initial operation.

6 Guaranteed Performance

We guarantee the operating performance of the complete project both from a standpoint of hourly capacities as well as manufacturing costs covering each operational phase involved. In most every case, these guarantees are exceeded by a safe margin. Should deficiencies develop, prompt corrective measures are taken at our expense.

7 Training of Personnel

After its initial startup, our Operations Engineer remains at your plant to thoroughly train your key production personnel.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.

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- **STANDARDIZED PARTS.** Ford, Timken, Vickers, Bendix, etc., assure highest quality components and low-cost servicing.
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- **LOW COST.** You save on first cost, operating costs and maintenance costs with a LOAdALL.
- **LOAdALL BUCKETS.** Available with capacities of ⅜, ¾, ⅞, 1, 1¼ and 1½ yards.

A HIGHLY MANEUVERABLE POWER SHOVEL

Lessmann LOAdALL scoops up big loads of the most heavily compacted ingredients or finished fertilizers . . . does it in 5 seconds while standing still! Extra hydraulic cylinders supply Hydraulic Power Crowd. This means *loading* with hydraulics which eliminates ramming and spinning of wheels . . . *minimizes repairs, reduces maintenance!* Dozer blade is easily attached for yard maintenance. Crane-hook, lift forks, snow and trash buckets are also available.

9 FT. DUMPING CLEARANCE

LOAdALL has clearance for the highest trucks, bins and mixing hoppers. It loads or unloads at any height from 12" below wheel level to 108" above. Wheelbase of 73" and 12' turning radius make it highly maneuverable.

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Here's a full 4'4" reach at maximum clearance! LOAdALL carries load close but quickly boosts it *'way out ahead* for easier loading . . . another advantage of Hydraulic Power Crowd.

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Spencer Ups Crowe & Cantwell

Gordon Crowe

Dallas Cantwell

Spencer Chemical Co. has promoted Gordon Crowe, former senior technical service representative, to the newly created post of assistant manager, Technical Service section.

Also promoted was Dallas Cantwell, former agronomist for the northeast district, to the new position of assistant manager, Agronomy section.

Crowe joined Spencer in October, 1949, following graduation from Massachusetts Institute of Technology. He holds a degree in chemical engineering.

Cantwell has been with the Spencer Co. since November, 1950. He received his training in agronomy and education at the University of Tennessee and for two years served as associate county agent of Sedgewick County, Kan.

Hercules Powder Elects

A new treasurer and two new directors have been elected by Hercules Powder Co.'s board of directors.

John E. Goodman was named treasurer, succeeding Francis J. Kennerley who retired.

New company directors are John M. Martin, general manager of the Explosives department, and John R. L. Johnson, Jr., director of the Hercules Legal department.

R. H. Dunham, former president and chairman of the board, retired from active service in December. He is continuing, however, as a member of the board of directors.

New England Soils Show Fertility Gain

New England soils are more fertile today than they were 200 years ago, even though they have been cultivated longer than any other soil in this country, according to Dr. C. L. W. Swanson, head of the Soils department at the Connecticut Agricultural Experiment Station.

Although naturally infertile, most soils in the six New England states are highly responsive to fertilization, Dr. Swanson said. Moreover, the region's agriculture is highly intensive and large quantities of fertilizer are applied to the land each year.

The department head, who is chairman of a special subcommittee studying the changing fertility of New England soils, stated that their findings indicate that in general more nitrogen, phosphorus and potash are being returned to the region's soils than are being removed by crops.

Where a fertility decrease was noted, nitrogen was the element which is being removed faster than it is being replaced.

Comparing his section's soils with those of the mid-west, he said that they have "made" fertility rather than the "built-in" or natural fertility of midwestern soils.

APFC-Grange Contest

Theme of the American Plant Food Council-National Grange 1954 Essay Contest is "Building Fertility to Cut Farm Costs."

Any young man or woman under 21 may win a sizeable cash award by submitting an essay on this subject by March 31, 1954. State and national prizes totaling more than $5,000 will go to the winners.

The contest is open to all youth, including Grange and non-Grange young people and is designed to "help the coming generation understand the importance of building soil fertility, sound land use and efficient production methods in cutting farm costs."

Many schools are joining with local Granges in sponsoring the contest as a part of their basic training in English and Conservation.

The first six national winners will be given expense-free trips to the 1954 Convention of the National Grange in the Pacific Northwest. Certificates of award will go to all state and national winners.

Judges include nationally prominent conservation and educational leaders, with Ezra Taft Benson, USDA secretary, heading the list.

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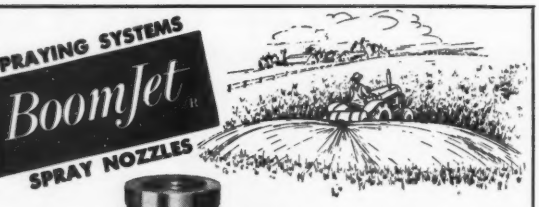

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Agronomists, Industry Reps Hold Joint Chicago Meeting

SOIL testing and factors affecting the time of application for fertilizer will be the key subjects discussed by soils research men at the annual joint meeting of midwestern agronomists and fertilizer industry representatives at the Palmer House in Chicago, Friday, Feb. 19.

More than 400 persons are expected to be in attendance at the meeting sponsored by the Middle West Soil Improvement Committee. Agronomists and fertilizer company personnel will exchange views in question and answer sessions following presentation of the reports.

Meeting chairman will be Dr. F. W. Smith, of Kansas State College. H. S. Vorhes, president of MWSI, and Z. H. Beers, the committee's executive secretary, will welcome the soils men and visitors.

Four agronomists will report on various aspects of soil testing at the Friday morning session.

George E. Smith, University of Missouri, will open with a discussion on "Fundamental Principles Involved in Soil Testing." John Hanway, Iowa State College, will deal with "Correlating Soil Test Information with Crop Response."

"Writing the Soil Fertility Prescription with Aid of Soil Test Information" will be the subject of a report by K. C. Berger, University of Wisconsin, and Paul M. Burson, University of Minnesota, is scheduled to discuss "Reporting Soil Test Information to Farmers."

The afternoon program will be devoted to discussions on the time of fertilizer applications and on future developments in soils and crops and what these mean to the fertilizer industry.

Edward H. Tyner, University of Illinois, will report on "Principles Involved in Selecting Time for Application of Fertilizer." Paul T. Truitt, president of the American Plant Food Council, will discuss "Fertilizer Production Facilities."

"What Does the Future Offer for the Fertilizer Industry?" will be considered by Harold E. Myers, Kansas State College. A. J. Ohlrogge, Purdue University, is to present the agronomists' list of recommended fertilizer grades and ratios for 1954.

Soils men will attend conferences of the North Central Soils Research Committee at the Palmer House for three days preceding the joint meeting. Dr. G. W. Volk, of Ohio State University, is chairman of the group.

Book Review

Soils and Fertilizers, fourth edition, by Firman E. Bear. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 420 pages, illustrated. $6.00.

Dr. Bear has entirely rewritten his popular text and has included much new material including a discussion of soil chemicals, chapters devoted to resources of important nutrients, up-to-date tables and recent data on the yield potentials of crop plants.

In his latest book, Bear considers the functions of the soil, analyzing its origin, nature, constituent elements and future needs. Material is included on topics such as soil management, moisture control, mechanical operations, organic matter maintenance and conservation.

Mathieson Promotions

Mathieson Chemical Corp. recently made the following personnel changes in its Agricultural Chemicals division:

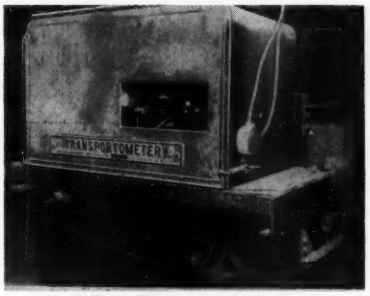
Three sales representatives promoted: R. H. Dorsett to administrative assistant in the Sales Service department at Little Rock, Ark.; J. W. Murphy to district sales supervisor with headquarters at Jackson, Miss. and C. S. Schoolfield to assistant sales manager, Baltimore, Md.

O. L. Robertson, chief irrigation mechanic, became irrigation service representative at Williamston, N. C., and D. R. Stoneleigh, associate director of agricultural market development, was named agricultural specialist of the Commercial Development division in Baltimore.

Thomas Warren joined the division as a salesman in Williamston, N. C. New field sales representatives are Earl Abbott, Decatur, Ill.; Lee Hays, Richmond, Ind. and Paul Marshall, St. Louis, Mo.

Offset Transportometer

A new offset Transportometer weighing scale has been designed by Sintering Machinery Corp. of



Offset Transportometer

Netcong, N. J., for use on new or existing belt conveyor installations where overhead clearance is limited.

The unit illustrated has been installed at the North Jersey Quarry Co. plant for weighing crushed stone being loaded into 65-ton freight cars at approximately 200 tons per hour. The 24 inch wide belt conveyor operates at 285 FPM.

Sintering company says its Transportometer line is used in mining, smelting and refining fields, chemical and food processing and many other industries requiring continuous weighing and feed regulating equipment.

S. C. Society Meetings

A series of four meetings for fertilizer manufacturers, dealers and other interested persons last month was held by the South Carolina Plant Food Educational Society, in cooperation with other agricultural agencies.

The meetings, which were held in Orangeburg, Hartsville, Columbia and Spartanburg on Jan. 19–22, respectively, were arranged so that those concerned could attend without extensive travel.

Stressed at the meetings was the efficient use of fertilizer and lime. Recommended fertilizer analyses and rates for 1954 were announced and the American Plant Food Council's new film, "Making the Most of a Miracle," was shown.

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Dust Weigh Hoppers
Batching Hoppers
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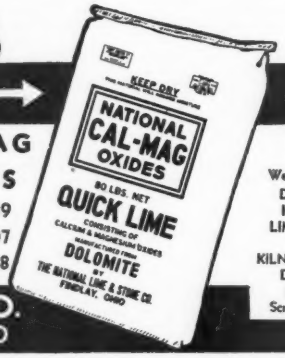

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Insecticide Sales in Miss. Near Record

Sales of cotton insecticides in Mississippi during 1953 reached a near record according to A. G. Bennett, leader of extension agronomy in that state. Bennett said that usage of insecticides and favorable weather combined to give cotton growers in the state an average lint yield of 427 pounds per acre.

By far the greatest usage of dust formulations occurred with the three per cent BHC—five per cent DDT mixture which accounted for over 36 million pounds. Other top dusts, all with over a million pounds consumption, included three per cent BHC—10 per cent DDT, 20 per cent toxaphene, 1½ per cent dieldrin and 1½ per cent dieldrin—10 per cent DDT.

Over 190,000 gallons of six pound toxaphene emulsion concentrate were used in addition to better than 50,000 gallons of four and eight pound toxaphene formulations.

In a letter addressed to insecticide companies, Bennett stated that those persons in Mississippi charged with the responsibility of the educational program for control of insect pests and especially cotton insect control were "grateful for the cooperation and fine work that those of you in private industry are doing to meet this challenge."

General Chem. Appoints

General Chemical division of Allied Chemical & Dye Corp. last month appointed three vice presidents to head major segments of its operations.

Vincent W. Suellau has been named vice president in charge of sales; I. H. Fooshee, vice president in charge of development, and Harry S. Bowen, vice president and auditor.

Suellau, who joined the General Chemical's sales organization 33 years ago, has been director of sales since 1950.

Fooshee went to the division in 1947 from Neches Butane Products Co., where he served as vice president. He has held the positions of assistant to the president, director of operations and director of development while with the division.

Bowen, with General Chemical since 1923, was made auditor in 1930 and assistant general manager in 1938.

Chemical Const. Corp. Elects Exec. Vice Pres.

Chemical Construction Corp. last month announced the election of an executive vice president and two vice presidents and the appointment of an assistant to the president.

Executive vice president is J. H. Rusken, who joined American Cyanamid Co., parent company of Chemical Construction, in 1947 as a member of the legal department. He later served as assistant secretary and assistant general manger of its Petrochemicals division.

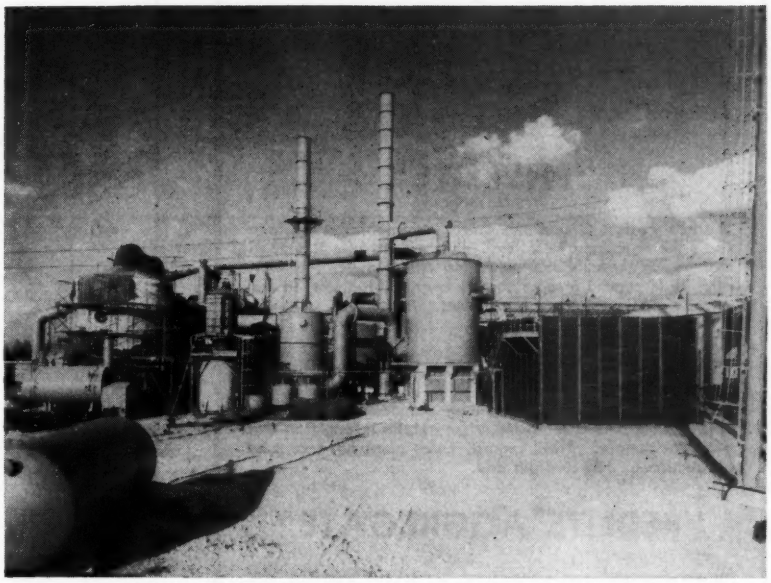
G. I. Weybold and Martin de Simo were named vice presidents, and Thomas P. Forbath, assistant to the president.

These three men formerly held executive posts with the subsidiary.

Bemis Promotes Braxtan

New assistant manager of Bemis Bro. Bag Co.'s Minneapolis plant is J. T. Braxtan. He is succeeded in his former position as office manager by R. E. Copeland.

New Davison Sulfuric Unit



View of sulfuric acid production unit at The Davison Chemical Corp.'s Florida triple superphosphate plant. Structure above with scaffolding still in place is the converter, with boiler and other water equipment in front and at side. Item with shorter stack is the absorbing tower where SO_3 is absorbed in H_2SO_4. Box-like structure (right) is acid cooler.

Production of sulfuric acid was expected to start early in January at Davison Chemical Corp.'s Bartow, Fla. production unit. Output of acid was expected to precede main process operations by approximately two weeks, the company announced.

Rated capacity of the acid unit, 550 tons of 100 per cent sulfuric acid per calendar day, will make it the world's largest unit producing this chemical, according to records of Monsanto Chemical Co., designers of the plant.

The contact process is employed, under which sulfur is burned to give sulfur dioxide, which is converted by catalytic contact to sulfur trioxide. This then is absorbed to give sulfuric acid. Heat developed in the reaction is used to produce steam which powers many pieces of equipment in the triple superphosphate and acid plants.

Capacity of the triple superphosphate plant is rated at 200,000 tons annually, which is estimated to make Davison the second largest producer of this chemical. Initially, the entire output of the acid unit will be required in the main process. Later, there may be a surplus of acid for sale.

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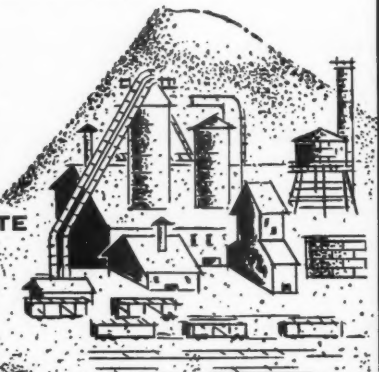

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Insect Activity as Reported by USDA and State Workers

Insect Report

RECENT issues of the Cooperative Insect Report*, published by the Bureau of Entomology and Plant Quarantine, have included data on the 1953 situation and 1954 prospects that are of considerable interest to pesticide manufacturers.

The following notes were selected from these reports and include references to many economic pests, their prevalence during the last growing season and, for some, the 1954 outlook.

Although the 1953 fall European corn borer count in Minnesota showed only 64 borers per 100 plants, 25 lower than in the previous fall, it is reported that a greater proportion are in a mature condition.

The survey revealed sufficient numbers of the pest to cause considerable loss this year, especially if weather conditions are favorable for development at the time of egg laying and hatching.

The situation differs considerably in Indiana where the fall survey showed overwintering borer populations to be up nearly 60 per cent over 1952. They were in better condition than a year ago.

****

Kentucky acreage infested with armyworms during 1953 is expected to reach 1,055,000 acres and damage is estimated at about $8.78 million. It is reported that approximately 20 per cent of the affected acreage was sprayed.

****

Infestations of grasshoppers and Mormon cricket were unusually extensive in Utah and control on range, farm and pasture included 101,390 acres sprayed or baited by aircraft plus considerable areas which were treated by ground equipment. Pea aphid outbreaks in that state were severe over a large area and about 26,000 acres of alfalfa required Spring control.

Black hills beetle continued in outbreak numbers in the Dixie National Forest and Bryce Canyon National Park. An estimated 7,375 ponderosa pine will require treatment this spring.

****

In Indiana, the armyworm outbreak was reported the most widespread and abundant since 1911 and apparently was indirectly due to the weather conditions which prevented normal development of parasites. It is estimated that farmers in the state were saved at least seven million dollars through the services of insecticide dealers, custom applicators and county agents.

Another Indiana note of special interest is that there are indications there may be a carry-over of chinch bugs which could develop a serious infestation this year. Damage was not serious during 1953 although the pest was "destructively abundant" in northeastern areas and to a lesser degree in the northwest.

****

A well established infestation of Japanese beetle in the corn belt area of Newton county, Ind. and Iroquois county, Ill. has been reported. The information states that a rapid spread to adjacent areas can be anticipated unless effective extermination methods are practiced.

****

An examination of surface or ground trash in Madison parish, Louisiana has shown the average number of boll weevils per acre to be 5,239. This is more than four times greater than the number found in the fall of 1952 and is the highest reported in the parish since record keeping began in 1936.

****

During the summer of 1953, more than 1,487,000 acres of trees in New England were defoliated by the gypsy moth. The previous high of 821,500 acres occurred in 1945 and attacks last year resulted in far greater mortality than in any year since the pest became established in this country.

On the basis of fall observations, it is expected that defoliation next summer will be at least equal to and perhaps greater than that which occurred last year. The only hope for reduction in defoliation is the possibility of heavy egg mortality during the winter months.

****

An insect control program involving 60 to 70 thousand acres of cane and corn brought under control the sugar cane border on most large acreages in Louisiana. The infestation was the worst since 1926.

A laboratory for production of an egg parasite of the borer was placed in operation during June and nearly 60 million parasites were released. Plans are underway to increase production to about 400 million this year with an earlier release date.

****

Several fields of yams in Orange and San Diego counties, Cal. were found riddled by small holes found to be caused by flea beetle larvae. One grower estimated his loss from this damage at $6,000.

****

A light infestation of green peach aphid is expected in the Yakima valley, Wash. this Spring. Eggs found on fruit trees during a fall survey were very scarce. In November, 1952, an average of 35 eggs per four inch peach twig were reported.

****

Buckthorn aphid egg counts were found sufficient to produce potentially serious early-season popu-

** This publication is now named the "Cooperative Economic Insect Report" and is issued by the Plant Pest Control Branch, Agricultural Research Service, USDA.*

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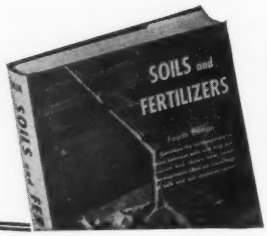

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ATLANTA UTILITY WORKS EAST POINT, GA.

lations in a November survey of conditions in northeastern Maine.

****

In Nevada, an estimated 18,000 acres of cropland were treated for grasshopper control last year and about 30,000 acres infested with rangeland grasshoppers were controlled in conjunction with the Mormon cricket control program.

Mormon cricket has been on the build-up for three years and it was found necessary to bait about 484 thousand acres of rangeland. Excellent results were reported in all areas.

****

Last year was termed an "aphid year" by Massachusetts authorities who reported heavy attacks on almost all susceptible crops. They were especially persistent on vine crops and crucifers.

****

In parts of the Lake Labish region the heaviest infestation of onion maggots ever recorded in that state was reported for 1953. A recent survey showed as many as 247 overwintering pupae per square foot of soil.

****

A number of areas recorded alfalfa plant bugs for the first time during 1953. Included were localities in Delaware, Maryland, New Jersey, Pennsylvania, Virginia and West Virginia.

****

Hundreds of thousands of acres of forest land in Vermont were defoliated by forest tent caterpillar accompanied by the linden looper and spruce budworm. In the southern Connecticut river and Champlain valleys, damage was accentuated by a gypsy moth outbreak coincidental with and following the tent caterpillar.

The outlook for next year, based on a cooperative egg-mass survey, is for conditions as bad if not worse in intensity and extent. ◆

Wisc. Dealers School

A lime and fertilizer Dealers School was held on Jan. 26 in Madison, Wisconsin under the auspices of the Department of Soils and Agricultural Extension Service, University of Wisconsin.

It was held in connection with the Pacemakers Corn Club Round-up and many farmers attending the round-up were expected also to attend the fertilizer dealers school.

Speakers included E. Truog, O. J. Attoe, A. E. Peterson, K. C. Berger and C. J. Chapman. Three top "Pacemakers" were scheduled to reveal their secrets and a group of county agents were to discuss ways of improving the program.

Features of a dinner, closing out the conference, included an address by Frank Peck, managing director, Farm Foundation, and a showing of the APFC film, "Making the Most of a Miracle."

Oregon Meetings

Oregon fertilizer manufacturers, mixers and dealers last month were invited to attend a series of meetings on Jan. 21 at Corvallis, Jan. 26 at Forest Grove and Feb. 9 at Corvallis.

The first was a state-wide meeting and results from 1953 fertilizer experiments conducted throughout the state were summarized. Oregon's soil fertility program for 1954 was outlined.

Local fertilizer recommendations were reviewed at the district meeting of Northern Willamette valley dealers and mixers on Jan. 26, and fertilizer trials for that area were discussed.

On Feb. 9, Southern Willamette valley representatives were to be given information on fertilizer trials and soil testing results in their locality. Recommendations for that area also were reviewed.

The state extension service sponsored the meetings.

OEEC Phosphate Report

STUDIES of methods for saving sulfuric acid in the production of phosphate fertilizers are included in a report compiled by a group appointed by the OEEC Sub-Committee for Scientific Research and Technical Development.

Entitled, "Sulfuric Acid and the Manufacture of Phosphatic Fertilizers," it outlines principal methods of manufacturing alternative phosphate fertilizers in OEEC member countries.

Chemical reactions occurring at each stage in the processes are not described and no mention is made of the usual methods of producing superphosphate. The booklet does indicate the raw materials and services required and describes both processes which have reached the industrial stage and a few which are only in laboratory or semi-industrial stage.

It is pointed out that although economy of sulfuric acid was the principal reason for the study, use of other raw materials as substitutes would bring into consideration other factors such as plant capacity for nitrogen fixation and generation of cheap electric power for production of nitric or phosphoric acid by the electric furnace process.

The report states that, although considerable quantities of these newer phosphatic fertilizers have been used for some time, it is still an open question whether there is a difference in crop response under the same conditions with the two types of fertilizers, compound or complex.

It is recommended by the work group that competent authorities assemble existing publications on this subject with reference to both new and old fertilizers. Because of the interest in the new materials, the group proposed that an OEEC committee bring together all existing works on the agronomic results with complex fertilizers and make arrangements for the necessary additional scientific trials.

Copies of the report are available from The Ryerson Press, 299 Queen St., W., Toronto, and "Periodica," Inc., 4234 de la Roche, Montreal, Canada. It is priced at two dollars.

Wilbur-Ellis Purchases Marine By-Products Co.

Wilbur Ellis Co. has purchased the Portland, Ore. plant of Marine By-Products Co. and will operate it as Marine Products Co., division of Wilbur Ellis Co.

Ed Asbill has been named manager, replacing Peter Harris, who has retired.

FERTILIZER MATERIALS MARKET

New York

January 11, 1954

Sulfate of Ammonia

With the government asking for bids for a large quantity for Korea, little price weakness was shown in this market, although producers' supplies on hand were said to be rather substantial at most points. A good deal of freight equalizing is going on which really is one way to lower the price without attracting too much attention.

Nitrate of Soda

Only a small seasonal movement is reported at this time and stocks at most ports are adequate to fill any expected demand.

Urea

Domestic production was said to have been recently increased and increased offerings of imported urea have created a rather easy market. Current price is approximately $120 per ton, f.o.b. domestic production points and also at Atlantic ports.

Nitrogenous Tankage

The price ranges from $3.50 to $4.25 per unit of ammonia ($4.25 to $5.16 per unit N) f.o.b. production points, with demand said to be fair for this time of year. Some lots of imported material have recently arrived at Atlantic ports.

Castor Pomace

Demand continued steady for castor pomace with last sales on the basis of $25 per ton, f.o.b. eastern production points. Because of the sharply lower price compared with last season's price, more buyers are using this material.

Organics

Organic fertilizer materials were in better demand and prices showed a firm tendency. Buying from feed channels was particularly heavy in the last two weeks. Blood sold at $7.50 per unit of ammonia ($9.12 per unit N), f.o.b. New York, with offerings scarce. Tankage sold at $6.75 ($8.20 per unit N), f.o.b. New York. Soybean meal was quoted at $72.50 per ton in bulk, f.o.b. Decatur, Ill. and linseed meal was wanted for nearby shipment. With reports current that all the government-owned cottonseed meal had been disposed of to drought areas, stronger prices were the rule for this material with $65 per ton, f.o.b. Memphis the general asking price.

Fish Meal

Little trading activity was reported but some sales were noted of imported material at Atlantic ports at $133 per ton. Most of the menhaden fish meal was in strong hands and held higher in price.

Bone Meal

This material is slightly firmer in price and quotations of $55 per ton, f.o.b. production points seem to be about the best that can be done at this time.

Hoof Meal

Demand recently increased for this material and prices advanced to approximately $7 per unit of ammonia ($8.51 per unit N), f.o.b. Chicago with little material available. Sources other than fertilizer were reported buying.

Superphosphate

With heavy stocks on hand at most production points, producers are trying to get their contract buyers to take in some material at this time but most manufacturers of mixed fertilizer have their storage bins pretty well filled. A better supply of triple superphosphate is expected during 1954.

Potash

A slightly better movement was reported by most producers and it was thought within another 30 days a heavy shipping schedule would be maintained.

Philadelphia

January 11, 1954

While there is a little more action, the fertilizer materials market is not in its best shape. Blood and tankage are higher and in fairly strong demand, particularly for export. Shipments of potash and superphosphate have picked up. Bone meal, fish scrap and castor pomace are presently very quiet. It is expected that things will open up shortly.

Sulfate of Ammonia.—Considerable interest is displayed in government buying for Korea, aside from which the market continues quiet. Coke-oven production is off.

Nitrate of Ammonia.—Movement against contracts is reported somewhat slower, although production is sold well ahead, and in a few instances some deliveries are said to be a trifle behind schedule.

Nitrate of Soda.—There is nothing new to report in this department. Market is seasonally quiet, but sellers expect renewed activity shortly. Prices remain unchanged.

Blood, Tankage, Bone.—Blood is scarce and much stronger at $8 to $9 per unit ammonia ($9.72 to $10.94 per unit N), depending on location. Tankage is quoted at $6.75 to $7 per unit ($8.20 to $8.51 per unit N) in the east, and $7.50 to $8 ($9.12 to $9.72 per unit N) in the Chicago area. Bone meal still is quoted at $55 per ton, but can be had at several dollars per ton under this. Hoof meal now is quoted at $7 per unit ammonia ($8.51 per unit N) in Chicago area, but demand is very poor.

Castor Pomace.—This still is quoted at $25 per ton at producing plants, but demand is very quiet.

Fish Scrap.—Market is quiet with owners apparently not interested in selling menhaden meal at $134 to $135 per ton, which appears to be the market. However, this is more or less nominal as demand is exceedingly slack.

Phosphate Rock.—Shipping situation slightly improved with supply position quite satisfactory.

Superphosphate. Shipments against contracts are moving somewhat better. Supply is ample although production of normal grade is down.

Potash.—Market is quiet but movement on contracts shows improvement. It is expected that withdrawals will very much increase in another month or so.

Tentative Plans for

Entomology Centennial

INITIAL plans for commemorating the centennial year of professional entomology have been developed by committees assigned by the Entomological Society of America, National Agricultural Chemicals Association and the USDA.

Purpose of the celebration is to give the general public information about the insect problem and contributions which the profession has made to our national economy and to the health and welfare of the individual during its 100 years of existence.

Objectives of the various phases now under consideration include:

Cooperation. To enlist and secure cooperation and aid from organizations and societies of the allied sciences.

Newspaper and Magazine Coverage. To obtain coverage imparting information about insects and the advances and contributions made during the 100 years.

Radio and TV Shows. To obtain maximum broadcasting coverage through radio and TV cooperation in order to fully inform the general public about entomology.

Commemorative Postage Stamp. An attempt will be made to have issued a three-cent commemorative stamp with a "first day of issue" celebration and use of the slogan, "Fight Your Insect Enemies," as a cancellation.

Pamphlet. A USDA Information Bulletin to be issued early in May, presenting information on what insect control means and what it has accomplished.

Educational Work with Youth. To develop an educational program for young people to acquaint them with the importance of the insect problem.

Commercial Dedications and Advertisements. To obtain cooperation among national advertisers for devotion of June advertising space to the subject of entomology.

Open House. To get Federal, state and industrial laboratories to hold an open house for the public during June 14–18 to show what entomology has done and is doing.

Banquet. A commemorative banquet at a leading Washington, D. C. hotel with RSVP invitations going to presidents and executive committees of organizations and societies of allied sciences.

The Supervisory group in charge of the centennial committee and under the direction of David G. Hall, is composed of B. B. Pepper, L. A. Stearns, W. S. Moreland, M. R. Budd and G. H. Bradley.

Members of the committee include both Lea S. Hitchner and Val E. Weyl of NAC Association in addition to R. B. Rathbone, C. H. Cunningham, Gene Perrin, R. P. Regan, E. D. Burgess, A. D. Cushman, Edmund Greene, K. A. Haines, E. F. Knipling, C. M. Nichols and M. P. Jones. ◆

Alphabetical List of Advertisers

American Agricultural Chemical Co., New York City..... 6
American Potash & Chemical Corp., New York City..... 42
Armour Fertilizer Works, Atlanta, Ga..... 52
Ashcraft-Wilkinson Co., Atlanta, Ga.....27, 54
Atlanta Utility Works, The, East Point, Ga..... 60
Baker & Bro., H. J., New York City..... 10
Berkshire Chemicals Inc., New York City..... 54
Bradley Pulverizer Co., Allentown, Pa..... 60
Butler Manufacturing Co., Kansas City, Mo.....40, 41
Chemical Construction Corp., New York City..... 38
Clark Equipt. Co., Battle Creek, Mich..... 1
Commercial Solvents Corporation, New York City..... —
Davison Chemical Corporation, Baltimore, Md..... —
Diamond Alkali Co., Newark, N. J..... 16
Duval Sulphur & Potash Co., Houston, Tex..... —
General Industrial Development Corp., New York City..... —
Gruendler Crusher & Pulverizer Co., St. Louis, Mo..... —
Hammond Bag & Paper Co., Wellsburg, W. Va..... —
Hudson Pulp & Paper Corp., New York City..... —
International Paper Co., Bagpak Div., New York City..... —
International Minerals & Chemical Corp., Chicago, Ill.....Back Cover
Jackle, Frank R., New York City..... 56
Keim, Samuel D., Philadelphia, Pa..... 56
Kraft Bag Corporation, New York City..... —
Lessmann Mfg. Co., Des Moines, Ia..... 52
Link-Belt Co., Chicago, Ill..... 19
Lion Oil Company, El Dorado, Ark..... 22
Marietta Concrete Corp., Marietta, Ohio..... 9
Mathieson Agricultural Chemicals Co., Little Rock, Ark..... —
Monarch Mfg. Works, Inc., Philadelphia, Pa..... 60
Monsanto Chemical Co., St. Louis, Mo..... —
National Lime & Stone Co., Findlay, Ohio..... 56
Nitrogen Division, Allied Chemical & Dye Corp., New York City.....Front Cover
Phillips Chemical Co., Bartlesville, Okla..... —
Pioneer Pyrophyllite Producers, Beverly Hills, Calif..... 58
Pittsburgh Coke & Chemical Co., Agricultural Chemical Div. 30
Potash Co. of America, Washington, D. C.....Third Cover
Raymond Bag Co., Middletown, Ohio.....Second Cover
Sackett & Sons Co., The, A. J. Baltimore, Md..... 50, 51
Schmutz Mfg. Co., Louisville, Ky..... 44
Shell Chemical Corporation, Denver, Colo..... 2
Shuey & Company, Inc., Savannah, Ga..... 60
Southwest Potash Corporation, New York City..... 14
Spencer Chemical Company, Kansas City, Mo..... —
Spraying Systems Co., Bellwood, Ill..... 54
Stedman Foundry and Machine Co., Inc., Aurora, Ind..... 56
Summit Mining Corp., Carlisle, Pa..... 49
Tennessee Corporation, Atlanta, Ga.....4, 35
Texas Gulf Sulphur Co., New York City..... —
Union Bag & Paper Corp., New York City..... —
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla..... 58
United States Potash Co., New York City..... 46
Wiley & Company, Inc., Baltimore, Md..... 60
Wiley & Sons, John, New York City..... 60
Woodward & Dickerson, Inc., Philadelphia, Pa..... 85

editorial

H. R. 7125: A New Miller Bill

INDUSTRY members will remember last April, when Representative A. L. Miller (R-Neb.) introduced H. R. 4277, the Miller Bill providing for closer regulation of pesticides used in food production.

For a little while things went fine. Miller received support from NAC, Farm Bureau, National Grange, National Cotton Council and other groups, and it looked as though the bill might become law.

Then Oveta Culp Hobby, Secretary of Health, Education and Welfare recommended to the House Interstate Commerce Commission that the bill be revised, amended or dropped. Further opposition came from two Federal judges who stated that the appeal provision would place too great an administrative burden on the courts.

That scuttled the original Miller Bill.

Now the Nebraskan legislator has presented a new bill, H. R. 7125, which seems to have overcome most of the more serious objections raised last year.

Lea Hitchner, NAC executive secretary, states that the bill "is in the public interest and is a practical, realistic approach to regulating the use of farm chemicals to protect crops against pests."

A PROPOSED amendment to the Federal Food, Drug and Cosmetic Act, the measure pertains to the residues of farm chemicals in or on raw agricultural commodities following the use of these chemicals in the production, transportation and storage of food products.

This terminology should help, somewhat, to satisfy one of Mrs. Hobby's objections; that the original bill barred only foods containing excessive residues from interstate commerce and not the pesticides themselves.

According to Miller, the new procedure would require the manufacturer of a new pesticide to first file a petition with the Food and Drug Administration requesting establishment of a tolerance. Reasons in support of the petition would have to be supplied in addition to scientific data.

The producer would also be required to request the Secretary of Agriculture to certify to the Secretary of H, E & W that the pesticide is useful for its intended purpose and that the requested tolerance is in line with the amount of residue likely to result when the material is used as proposed.

Within 90 days, the FDA would be required to establish a tolerance. During this period the producer or the secretary could request that the matter be placed before an advisory committee of experts familiar with the problems involved.

Members of this committee would be appointed by the secretary from a list submitted by the National Academy of Sciences. After studying the data, the committee would report to the secretary, making recommendations of an advisory nature which would be considered in establishing a tolerance.

This appointment procedure is a modification of the method called for in the previous bill and results from FDA opposition. The first measure provided for an equal number of experts selected by the applicant, administrator and chairman of the Food Protection Committee.

Under H. R. 7125, according to Miller, any person "adversely affected by the tolerance issued under the foregoing procedure could request a public hearing on the tolerance or portions thereof deemed objectionable upon a showing of reasonable grounds."

THE order resulting from the hearing, either affirming or modifying the original tolerance would be published by the secretary. It would be subject to court review in "the manner generally prescribed in other regulatory statutes."

Hitchner has stated that he expects the new measure to receive support of both the pesticide industry and the major farm groups.

In this statement he added that it is considered an improvement over other provisions of the Food and Drug Act because:

1. It protects the consumer of foods by limiting the amount of residues which are permitted to appear in foods.
2. It provides for the establishment of a tolerance within a limited time after petition for a tolerance has been made.
3. It provides standards upon which manufacturers and state and Federal agencies can base directions for use of farm chemicals.
4. It provides standards upon which the Department of Health, Education and Welfare can base its responsibilities for enforcement of regulations to assure a safe food supply under the authority of the Food, Drug and Cosmetic Act.
5. It aids growers in their compliance with the law by establishing guideposts to follow in the use of farm chemicals.

This measure was introduced following meetings involving the industry, FDA, the House Interstate Commerce Committee and Congressman Miller. We can be sure that Lea Hitchner's statement was made only after careful study and consideration of the capable NAC staff.

In view of this, we feel it important that the pesticide industry as a whole lend its full support to H. R. 7125. Serving industry, consumer and government, it is a move in the right direction.

—GEO. P. TEEL, JR.

Here's *free information* to help you solve fertilizer, pesticide problems

Reader Service

33—New Automatic Scale

The most recent bulletin from Richardson Scale describes a new automatic scale designed especially for bagging fertilizer. Included is complete data on available models and engineering drawings of a typical batch proportioning set-up. To obtain a copy

CIRCLE 33 ON SERVICE CARD

34—OMPA Bulletin

According to Monsanto, OMPA now can be used for control of aphids and mites on cotton. A technical bulletin offers data on storing, handling and formulating the systemic. For the bulletin

CIRCLE 34 ON SERVICE CARD

35—Iron Deficiencies

Glyco's iron tetrine has produced sensational results in curing iron deficiencies in citrus. Work is continuing on many other crops. For additional information

CIRCLE 35 ON SERVICE CARD

36—Precision-Built Motors

A new line of squirrel-cage induction motors is described in literature from Reliance Electric and Engineering. To obtain data, including a "Compar-A-Frame" chart showing dimensions of open and fan cooled models

CIRCLE 36 ON SERVICE CARD

37—Keys to Better Sprays & Dusts

A new bulletin from R. T. Vanderbilt tells how its products Pyrax, Darvan and Continental Clay can help you produce better formulations. For a copy

CIRCLE 37 ON SERVICE CARD

38—Illustrated Hudson Book

A well illustrated Hudson Pulp & Paper book shows how its multiwalls are made, inspected and guaranteed. If you haven't seen a copy

CIRCLE 38 ON SERVICE CARD

39—Toxaphene Emulsifier

Emcol H-83A is the latest emulsifier in the Emulsol line and is excellent for use with toxaphene, chlordane, malathion, DDT and some herbicides. For a technical bulletin describing the material

CIRCLE 39 ON SERVICE CARD

40—The Spreading Story

Highway Equipment Co. has a new story on the value of spreading services to fertilizer mixers and their dealers. Included are before and after figures on sales results, facts on winter spreading and bulk storage information for dealers. To receive this literature

CIRCLE 40 ON SERVICE CARD

41—Nitrogen from U. S. Steel

USS ammonium sulfate is available in bulk for mixing or bagged for direct application. Dry and free flowing, it's of top quality, easy to mix and handle and will not set up in storage. For information

CIRCLE 41 ON SERVICE CARD

How to use the

READER SERVICE CARD

- **Circle number of literature you want.**
- **Print your name, position, company and address.**
- **Clip and mail the Service Card.**

42—Combatting Acid Fumes

According to Koppers Co., Bitumastic protective coating No. 28 has proven its value in fertilizer plants by providing protection for galvanized roofing and siding. For further details

CIRCLE 42 ON SERVICE CARD

43—Fertilizer-Wetting Agent Tests

Udet-F has been used by several fertilizer manufacturers and results are now available. For a bulletin reporting on all phases of the tests

CIRCLE 43 ON SERVICE CARD

44—Four-Wheel Steering

A Shovel-loader from Baker-Lull utilizes four-wheel steering to obtain an inside turning radius of only 7′ 6″. A 19 foot wheel-base permits full weight to be placed on the rear wheels. To obtain additional information

CIRCLE 44 ON SERVICE CARD

45—Uni-Blender Bulletin

Poulsen Co. offers a technical bulletin describing blenders capable of producing insecticide formulations at reduced costs. The units are available in four mixer capacities ranging from 40 to 100 cubic feet. For a copy

CIRCLE 45 ON SERVICE CARD

46—Emulsifier 1869

Developed originally for toxaphene, Armour Chemical emulsifier 1869 has proven excellent for use with chlordane, DDT, lindane and low-vol 2, 4-D and 2, 4, 5-T. It can be added directly to herbicides without the use of a solvent. For a product data bulletin

CIRCLE 46 ON SERVICE CARD

47—Process Control Catalog

A 20-page catalog from Fischer & Porter lists a variety of flow meters, recorders, controllers, chemical feeders, etc. with complete instrument specifications. Discounts from list price and quantity discounts are included. To obtain the catalog

CIRCLE 47 ON SERVICE CARD

48—Robertson Fungicide

Technical information is available on Robertson Fungicide, a product with pure metallic copper in very fine powder form. The producer claims the material has good adhesion and ease of distribution when used as dust or spray. For information

CIRCLE 48 ON SERVICE CARD

49—Better Wettable Powders

According to Antara Chemicals, the Igepon line of wetting agents can help you produce better wettable powders with a variety of toxicants. The materials can be ground in without caking, offer faster wetting out, stable dispersion and controlled foaming. To get more details

CIRCLE 49 ON SERVICE CARD

50—Preform Multiwalls

Preform multiwalls from Bagpak division permit filling to the very bottom, faster closing operations, reduced sewing time and a better looking package. For full information

CIRCLE 50 ON SERVICE CARD

51—Spray Nozzles

Spraying Systems offers over 400 interchangeable orifice tips as well as a wide range of related equipment. For a bulletin containing data on the spray nozzle line

CIRCLE 51 ON SERVICE CARD

52—Auto Filling Scale

A fully automatic Thayer scale, Model 44N, handles units from 25 to 200 pounds at speeds up to 10 units per minute. For details on this model, which is also available as a gross weigher,

CIRCLE 52 ON SERVICE CARD

53—Ethyl Lindane Booklet

Ethyl offers a booklet full of facts and figures on formulation and application of lindane which is valuable for both the formulator and customer. To obtain the 30 page guide

CIRCLE 53 ON SERVICE CARD

54—Fertilizer Buckets

Tight fitting cast chrome-nickel-molybenum alloy steel lips on Blaw Knox chemical and fertilizer buckets stop leakage and resist abrasion. For a bulletin describing all important features

CIRCLE 54 ON SERVICE CARD

55—New Wetting Agent

The manufacturer of Monawet MO wetting agent feels that the material may have considerable application in the pesticide field. If interested in this stable compound

CIRCLE 55 ON SERVICE CARD

56—Insecticide Processing

Complete plant equipment for both impregnation and dry powder blending is offered by Young Machinery. The company feels that it can help solve your processing problems. To obtain a bulletin on this equipment

CIRCLE 56 ON SERVICE CARD

57—High Quality DDT

DDT of high purity and uniformity is produced by Michigan Chemical. To get a complete catalog of its products including data on technical, dust concentrate and 75 per cent wettable powder DDT

CIRCLE 57 ON SERVICE CARD

How to use the
READER SERVICE CARD

- **Circle number of literature you want.**
- **Print your name, position, company and address.**
- **Clip and mail the Service Card.**

58—Storage Catalog

Marietta permanent storage systems may provide a solution to one of your problems. According to the company, design flexibility provides for any discharge or servicing system. For a complete catalog of the Marietta line

CIRCLE 58 ON SERVICE CARD

59—Check Filled Bags Faster

With the Model 1302 scale, seconds can be trimmed off each weighing operation according to Exact Weight Scale. The unit fits right in on a floor level conveyor line and controlled travel brings scale indicator to rest quickly. For details

CIRCLE 59 ON SERVICE CARD

60—Soluble Concentrated Fertilizers

Interest in these products is developing rapidly and Monsanto phosphates are suggested because of their high concentration. They permit closely controlled formulation. You can get your copy of a booklet on soluble concentrated fertilizers if you

CIRCLE 60 ON SERVICE CARD

61—Free-Flowing Fertilizers

Celite fillers offer high absorption properties and a unique structure making them unusually effective in stopping cake-up in mixed fertilizers. For additional information

CIRCLE 61 ON SERVICE CARD

62—Fertilizer Blenders

Owners of C. S. Johnson complete blending plants report a savings in manpower with production increases. Units include all equipment from bucket elevator and belt conveyor to weigh batcher and liquid facilities. To get more data

CIRCLE 62 ON SERVICE CARD

63—Dorr Bulletin

A bulletin from Dorr Co. provides information on Dorr's experience and facilities in the field of concentrated fertilizers. For a copy

CIRCLE 63 ON SERVICE CARD

64—Digs While Standing Still

The Lessmann Loadall power shovel is equipped with extra hydraulic cylinders which permit it to dig into piles of ingredients or mixed goods while standing still. Has nine foot dumping clearance and 52 inch reach. Write for full information.

CIRCLE 64 ON SERVICE CARD

65—New Nitrogen Source

Grace Chemical Co. will soon be supplying urea and anhydrous ammonia to the industry. A new illustrated brochure is available to introduce you to this new basic producer.

CIRCLE 65 ON SERVICE CARD

66—St. Gobain Plants

According to the manufacturer, one St. Gobain unit can produce complex fertilizers in a variety of NPK formulae without alteration of equipment. The continuous process offers low operating costs and unusually high yields. For complete data

CIRCLE 66 ON SERVICE CARD

67—Ammonia Storage

Butler tanks for storage of anhydrous ammonia are of 30,000 gallon capacity and feature strength and complete protection. Openings are located to provide a custom fit for specific storage jobs. For further information

CIRCLE 67 ON SERVICE CARD

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

AMMONIA—Anhydrous and Liquor

Commercial Solvents Corporation, New York City
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM PHOSPHATE

Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE

See Sulfate of Ammonia

AMMONIUM SULFATE NITRATE

Baker & Bro., H. J., New York City

BAGS—Multiwall-Paper

International Paper Co., Bagpak Div., N. Y. C.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Hudson Pulp & Paper Corp., N. Y. C.
Kraft Bag Corporation, New York City
Raymond Bag Co., Middletown, Ohio
Union Bag & Paper Corp., New York City

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.

BAG CLOSING MACHINES

Fischbein Co., Dave, Minneapolis, Minn.
International Paper Co., Bagpak Div., N. Y. C.

BAG PRINTING MACHINES

Schmutz Mfg., Louisville, Ky.

BAG FILLING MACHINES

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BHC AND LINDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Diamond Alkali Co., Newark, N. J.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

BONE PRODUCTS

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID

Woodward & Dickerson, Inc., Philadelphia, Pa.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—Hoist, Crane, etc.

Hayward Company, The, New York City

CALCIUM ARSENATE

American Agricultural Chemical Co., N. Y. C.

CARS AND CART

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

CHEMISTS AND ASSAYERS

Shuey & Co., Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CHLORDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

CLAY

Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
National Lime & Stone Co., Findlay, Ohio

CONTROL SYSTEMS

Sackett & Sons Co., The A. J., Baltimore, Md.

CONVEYORS—Belt

Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

COPPER SULFATE

Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

DDT

Ashcraft-Wilkinson Co., Atlanta, Ga.
Diamond Alkali Co., Newark, N. J.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

DIELDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

DILUENTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Summit Mining Corporation, Carlisle, Pa.

DITHIOCARBAMATES

Berkshire Chemicals, New York City

DRYERS

Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS—Bucket

Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

EMULSIFIERS

Atlas Powder Co., Wilmington, Del.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., N. Y. C.
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Mathieson Agricultural Chemicals Co., Little Rock Ark.

FILLERS

Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES

American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Tennessee Corp., Atlanta, Ga.

HERBICIDES

Diamond Alkali Co., Newark, N. J.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS

Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga
Baker & Bro., H J., New York City
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES

American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Diamond Alkali Co., Newark, N. J.
Pittsburgh Coke & Chem. Co., Agr. Chem Div., Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.
U. S. Industrial Chemicals Co., New York City

IRON SULFATE

Tennessee Corp., Atlanta, Ga.

LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

LIMESTONE

American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon

Sackett & Sons Co., The A. J., Baltimore, Md.

Buyers' Guide

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Hayward Company, The, New York City
Hough, The Frank G. Co., Libertyville, Ill.
Lessman Mfg. Co., Des Moines, Ia.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Commercial Solvents Corporation, New York City
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic
American Agricultual Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

PENTACHLOROPHENOL
Monsanto Chemical Co., St. Louis, Mo.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
General Industrial Development Corp., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation Nicolay, New York City

POTASH—Muriate
American Potash & Chemical Corp., N. Y. C.
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.
Southwest Potash Corporation, New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., N. Y. C.
Baker & Bro., H. J., New York City
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

POTASSIUM PHOSPHATE
Monsanto Chemical Co., St. Louis, Mo.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SACKING UNITS
Sackett & Sons Co., The A. J., Baltimore, Md.

SCALES—Including Automatic Baggers
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Butler Manufacturing Co., Kansas City, Mo.
Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Mathieson Agricultural Chem'ls Co., Little Rock, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

TEPP
Monsanto Chemical Co., St. Louis, Mo.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

2, 4-D
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

2, 4, 5-T
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

UREA & UREA PRODUCTS
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

Yes, twenty years ago in this month of February, we made our first commercial shipment from the mine near Carlsbad. Because of

- ✓ **Unparalleled service to our customers**
- ✓ **An excellent product**

we have become the largest producer of high-grade Red Muriate of Potash in the industry.

We pledge you a continuance of this performance.

POTASH COMPANY OF AMERICA

Carlsbad, New Mexico

General Sales Office.....1625 Eye Street, N.W., Washington, D. C.
Midwestern Sales Office.....First National Bank Bldg., Peoria, Ill.
Southern Sales Office.....Candler Building, Atlanta, Ga.

Library
University Farm
St. Paul, 1, Minn.

phosphate
For the manufacture of complete fertilizers.

phosphate
For the manufacture of industrial chemicals.

phosphate
Ground rock phosphate for direct application to the soil.

phosphate
Defluorinated phosphates for feed and mineral manufacturers.

Phosphate Mines and Plants in Florida at Noralyn, Bonnie, Peace Valley, Achan, Mulberry; in Tennessee at Mt. Pleasant and Wales; in Mississippi at Tupelo.

phosphate division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

International phosphates for industry and agriculture